CALGRO M3
HOLDINGS
BUILDING LEGACIES

# NEW DEVELOPMENT ON ERF 1202 SOUTH HILLS AND PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2

## (1st DRAFT)


# TRAFFIC IMPACT STUDY JANUARY 2012


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# EXECUTIVE SUMMARY

This report contains a Traffic Impact Study undertaken for the following development:

New Development on Erf 1202 South Hills and the proposed Township South Hills Extension 2 (situated on Holding 88 Klipriversberg Estate Small Holding A.H. and Portion 65 (a portion of portion 7) of the farm Klipriversberg No. 106-IR).

The development is bounded by Southern Klipriversberg Road (M19), Nephin Road, South Rand Road (M38) and East Street, in the Moffat Park area. The applicant site is located in the southern part of Johannesburg within the area of jurisdiction of the City of Johannesburg.

An application for the following land uses was submitted by the town planner (refer to **Annexure A** for details):

**ERF 1202 SOUTH HILLS (Refer to Annexure A and B)**

| | |
|---|---|
| Residential 1 & 3 | : 2 565 dwelling units (Res 1 = 550 erven and Res 3 = 22 erven) – refer to |
| Primary School | : 1 Erf, for a school with a potential capacity 750 pupils. |
| Church | : 2 Erven |
| Crèche | : 1 Erf |
| Municipality | : 1 Erf - existing swimming pool |
| Public Open Space | : 20 Erven |

**PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2 (Refer to Annexure A and B)**

| | |
|---|---|
| Residential 1 & 3 | : 2 596 dwelling units (Res 1 = 1059 erven and Res 3 = 66 erven) |
| Business 1 | : 1 Erf for a shopping centre with a GLA of 4 000m². |
| Secondary School | : 1 Erf, for a school with a capacity 1 600 pupils. |
| Church | : 2 Erven |
| Crèche | : 2 Erven |
| Community facility | : 1 Erf |
| Municipality | : 1 Erf – Pickitup |
| Public Open Space | : 30 Erven |

The proposed development will generate 2 201 (AM Peak), 376 (Midday Peak – School Traffic), 1 672 (PM Peak) and 407 (SAT Peak) peak hour trips. Given the expected peak hour demand on the external road network, the study only evaluated the morning and afternoon peak hours.

The access arrangements for the portions of land can be summarised as follows:

**ERF 1202 SOUTH HILLS (Refer to Annexure A)**

Direct access from Nephin Road, at the following intersections:

Lily Road, directly opposite Frank Street

Wax Flower Road, directly opposite Messina Street

Snapdragon Road, directly opposite Winburn Street

Buttercup Road, directly opposite Coalbrook Street

Columbine Road, directly opposite Kinahan Road

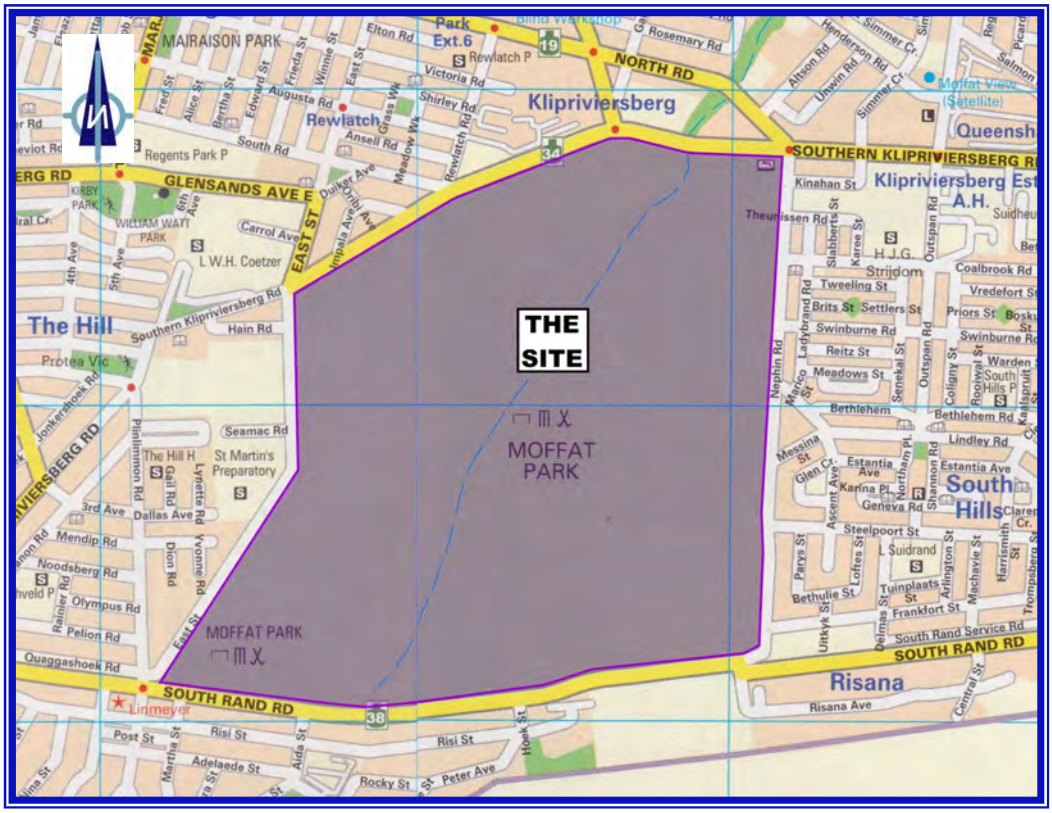
**PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2 (Refer to Annexure A)**

From South Rand Road, at Camel Thorn Road, directly opposite Aida Street

From East Road, at Milkwood Road, Buffalo Thorn Road and Weeping Willow Road.

From Southern Klipriversberg Road, at Boabab Road.

From Southern Klipriversberg Road, at Leadwood Road, directly opposite Vickers Road.



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**TRAFFIC IMPACT STUDY FOR NEW DEVELOPMENT ON**

**ERF 1202 SOUTH HILLS AND**

**PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

**(1ST DRAFT)**

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This report contains a Traffic Impact Study undertaken for the following development:

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The development is bounded by Southern Klipriversberg Road (M19), Nephin Road, South Rand Road (M38) and East Street, in the Moffat Park area. The applicant site is located in the southern part of Johannesburg within the area of jurisdiction of the City of Johannesburg.

The details of the developer involved with the projects/development are:

Calgro M3 Developments (Pty) Ltd

Private Bag X33

**CRAIGHALL**

2025

Attention: Mr. C Le Roux

Tel No.: 011 300 7500

Tel No.: 086 687 2129

This study was undertaken by traffic engineer:

Mr. Louis du Toit, P.O. Box 8864, Verwoerdpark, 1453

The traffic engineer has the following qualifications for undertaking Traffic Impact Studies:

Registered as a professional engineering technologist (Registration No. 200270072);

Baccalaureus Technologiae – Engineering Civil (Transportation) (1997); and

Experienced in the field of evaluating the traffic impact of developments.

# 2. STUDY METHODOLOGY

The traffic impact study was executed in accordance with the following guideline documents:

Department of Transport, 1995, **Manual for Traffic Impact Studies**.

Department of Transport, 1994, **South African Trip Generation Rates**.

The proposed development will generate more than 150 peak hour trips (based on the land use rights applied for and the recommended trip rates prescribed for each of the land uses) and the following procedure was followed in the execution of the study:

The extent of the study was determined by identifying the intersections in the vicinity of the development on which the traffic generated by the development may have a significant impact. The target years and peak scenarios to be analysed were also determined, based on the land-use and extent of the development.

The existing traffic flow patterns were surveyed, where after the functioning of the intersections was analysed. Recommendations were made on the need for road upgrades, without the development.

In the study, future traffic flow conditions were also taken into consideration, namely one target year, i.e. 5 years beyond the base year. Given the existing traffic, volumes and assuming a growth rate, the expected target year were determined, where after the intersections were again analysed and recommendations were made on the future road upgrades required.

In addition to the proposed development, the study also took into consideration the impact of other developments (latent rights) already approved or submitted to the local road authority for approval. For ease of reference, these developments will jointly be referred to as the **other development or latent rights scenario**.

The study also assessed the applicant site in terms of the Gauteng Transport Infrastructure Act.

Given the extent of the development and using the applicable trip generation rates, the expected number of trips that will be generated was determined.

The trip distribution of the traffic that will be generated by the proposed development was derived from the existing traffic flow patterns, the location as well as the potential market area of the development in relation to the road network. For ease of reference the proposed development will be referred to as **with or proposed development scenario**.

Given the trip distribution, the generated traffic was assigned to the road network together with the existing and estimated target year traffic volumes. The functioning of the intersections were again analysed and recommendations were made on the need for additional road upgrading necessary, due to the proposed development.

As part of the study, the existing public transport infrastructure was also evaluated and where required upgrading to the existing infrastructure was recommended.

The following documentations were also used as part of this study:

Gauteng Department of Transport; **Gauteng Household Travel Survey**; April 2004.

Peter Peska, 2007, **Residential Trip Generation Variables for South Africa**.

Akcelik and Associates (Pty) Ltd, 2011, **Sidra Version 5.1**.

Transport Research Board, 1994, **Highway Capacity Manual**.

Committee of Transportation Officials (COTO), 2004, **National Guidelines for Road Access Management in South Africa (RAM) (Draft)**.

Institute of Transportation, 2nd Edition, **Transportation and Traffic Engineering Handbook**.

# 3. PROPOSED DEVELOPMENT

## 3.1 DESCRIPTION OF PROPOSED DEVELOPMENT

This traffic impact study was undertaken for the new development on Erf 1202 South Hills and the proposed Township South Hills Extension 2 (situated on Holding 88 Klipriversberg Estate Small Holding A.H. and Portion 65 (a portion of portion 7) of the farm Klipriversberg No. 106-IR).

The location of the proposed development is shown in **Figure 1**.

## 3.2 EXISTING ZONING AND LAND USE RIGHTS

In terms of the Johannesburg Town Planning Scheme, 1979, the properties are zoned "Public Open Space". The existing land uses on the respective properties is as follows:

Erf 1202 South Hills – predominantly vacant with the presence of a sport facility in the middle of the property.

Proposed Township South Hills Extension 2 – predominantly vacant with the presence of a sport facility in the south-western corner of the property. In addition to this, Pickitup also operates a garden refuse collection point from the property; with access from East Street.

## 3.3 APPLICATION

An application for Erf 1202 South Hills and proposed Township South Hills Extension 2 was submitted by the town planner. The township application for the respective properties can be summarised as follows (refer to extract from township application and township layout appended in **Annexure A**):

Erf 1202 South Hills – application is for the removal of restrictive conditions and simultaneous rezoning of Erf 1202 South Hills is made in terms of the Town Planning and Township Ordinance, 1986, from Public Open Space to Residential 1, Residential 3, Educational, Institutional, Public Open Space and

Public Roads. The site measures 37.6546ha.

Proposed Township South Hills Extension 2 – The aim of the application is for the establishment of a township, to develop an Integrated Residential Housing Project. The site measures 161.97 ha.

Based on the above the rights applied for can be summarised as follows:

**ERF 1202 SOUTH HILLS (Refer to Annexure A)**

Residential 1 : Density at 1 dwelling units/erf

Residential 3 : Density at 240 dwelling units/ha, and a height of 4 storeys (which may be increased with the consent of the council.

Educational : Nursery school, crèche, day care and playgroups. The rights include tertiary institutions and schools, as well as Place of Worship. The height restriction is 3 storeys (which may be increased with the consent of the council. The Far is 0.4, and may be increased with special consent from the council.

Institutional : Place of Worship, Place of Instruction (nursery school, crèche, day care and playgroups), as well as Tertiary instructions, schools. Medical and consulting rooms. The height restriction is 3 storeys. The Far is 0.4 as per the scheme.

Public Open Space : Rights as per scheme.

Based on the above, the extent for each land use can be summarised as follows:

Residential 1 & 3 : 2 565 dwelling units (Res 1 = 550 erven and Res 3 = 22 erven) – refer to unit breakdown table appended in **Annexure B**.

Primary School : 1 Erf, for a school with a potential capacity 750 pupils.

Church : 2 Erven

Crèche : 1 Erf

Municipality : 1 Erf - existing swimming pool

Public Open Space : 20 Erven

**PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2 (Refer to Annexure A)**

Residential 1 : Density at 1 dwelling units/erf

Residential 3 : Density at 240 dwelling units/ha, at a height of 4 storeys (which may be increased with the consent of the council.

Business 1 : FAR of 0.6, and may be increase with the consent of the council.

Educational : Nursery school, crèche, day care and playgroups. The rights include tertiary institutions and schools, as well as Place of Worship. The height restriction is 3 storeys (which may be increased with the consent of the council. The Far is 0.4, and may be increased with special consent from the council.

Institutional : Place of Worship, Place of Instruction (nursery school, crèche, day care and playgroups), as well as Tertiary instructions, schools. Medical and consulting rooms. The height restriction is 3 storeys. The Far is 0.4 as per the scheme.

Municipality : Land Use Rights as per scheme.

Public Open Space : Land Use Rights as per scheme.

Based on the above, the extent for each land use can be summarised as follows:

Residential 1 & 3 : 2 596 dwelling units (Res 1 = 1059 erven and Res 3 = 66 erven) – refer to unit breakdown table appended in **Annexure B**.

Business 1 : 1 Erf for a shopping centre with a GLA of 4 000m².

Secondary School : 1 Erf, for a school with a capacity 1 600 pupils.

Church : 2 Erven

Crèche : 2 Erven

Community facility : 1 Erf

Municipality : 1 Erf – Pickitup

Public Open Space : 30 Erven

### 3.4 TIME FRAME OF DEVELOPMENT

The development will be undertaken in phases, and it is anticipated that the full development will be completed within 5 years.

## 4. STUDY AREA

### 4.1 EXTENT OF STUDY AREA

The study area for this application is shown in **Figures 1** and **2**, and is surrounded by the following streets:

To the north the property is bounded by South Rand Road.

To the east the property is bounded by the Nephin Road.

To the south the property is bounded Klipriversberg Road.

To the west the property is bounded by East Street.

### 4.2 LATENT LAND-USES AND DEVELOPMENTS IN STUDY AREA

At present no latent land use rights were identified that could impact on the findings of this report.

### 4.3 EXISTING ROAD AND STREET NETWORK

The existing surrounding road network is briefly discussed hereafter, and indicated on **Figure 1 and 2** respectively.

South Rand Road: The road is a Class 2 road, with one lane per direction along the section where it passes through the study area. The majority of intersections along the route, where it passes through the study area are unsignalised with priority on South Rand Road. The South Rand Road/Plinlimmon Road/Johan Meyers Street is signalised. The road forms a major east-west link and connects the study area with the R59 (Sybrand van Niekerk Freeway) and Heidelberg Road to the east. To the west the road intersects with Klip River Drive and Comaro Road in the west. All these roads form major north-south arterials linking the southern side of Johannesburg and Alberton area with the CBD and the northern areas of Johannesburg. The road forms the southern boundary of the property and access to the applicant site will be provided from South Rand Road. South Rand Road is classified as a Mobility Spine. The road falls under the jurisdiction of the Johannesburg Roads Agency (JRA).

Nephin Road is a north-south road intersecting with South Rand Road in the south and intersecting with Southern Klipriversberg Road/North Street in the north-eastern side of the applicant site. The road is a Class 3 road with one lane per direction. Speed humps are also provided at three points along the road, as part of the JRA's efforts to address speeding along the road. Direct access is also provided to the

residential properties along the eastern side of the road. Southern Klipriversberg Road/North Street/Nephin Road is traffic light controlled. From the east several roads intersects with Nephin Road, and based on the proposed development layout, access points will be provided directly opposite these intersections.

North Road forms the extension of Nephin Road, linking the study area Wemmerpan Road to the north-west. North Road is a Class 3 Road with one lane per direction. Direct access is also provided to the residential properties and businesses along both sides of the road. The road falls under the jurisdiction of the Johannesburg Roads Agency (JRA).

Vickers Road is a major north-south arterial and intersects with Southern Klipriversberg Road along the northern property boundary of the site. The road carries high volumes of commuter traffic. Vickers Road is a Class 3 Road dual carriageway road. No direct access is provided to adjacent properties, except the filling station on the north-western corner of Vickers Road/North Road intersection. To the north of the study area the road crosses the N17, with a partial diamond interchange to the east of Vickers Road alignment. The road falls under the jurisdiction of the Johannesburg Roads Agency (JRA).

Southern Klipriversberg Road is a Class 3 road, with one lane per direction. The road forms a major east-west commuter corridor and based on the proposed township layout, two access points are proposed from Southern Klipriversberg Road. Where the road abuts the applicant site, limited direct access is provided to individual residential properties. However, further east and west along Southern Klipriversberg Road. The road is classified as a Mobility Road, and forms part of the Strategic Public Transport Network (SPTN), of the City of Johannesburg. The road falls under the jurisdiction of the Johannesburg Roads Agency (JRA).

East Road is a Class 3 road, with one lane per direction. The road provides direct access to individual residential properties, residential clusters, crèche and the sports grounds and main school entrance located along the western side of East Road. Speed humps were also introduced along East Road, in the vicinity of the main entrance to the school, to reduce the speed and to promote road safety. East Road will also provide access to the new applicant site. The road falls under the jurisdiction of the Johannesburg Roads Agency (JRA).

## 4.4 INTERSECTIONS EVALUATED

For the purposes of this study, the following intersections were analysed (also refer to **Figure 1**):

South Rand Road & Plinlimmon Road/Johan Meyer Street - Signalised control intersection.

South Rand Road & Aida Street – Stop controlled with free flow on South Rand Road.

South Rand Road/Nephin Road & Risana Avenue - Stop controlled with free flow on South Rand Road.

South Rand Road & Risana Avenue - Stop controlled with free flow on South Rand Road.

South Rand Road & R59 (Sybrand van Niekerk Freeway) - Signalised control intersection.

Southern Klipriversberg Road & Nephin Road/North Road - Signalised control intersection.

Southern Klipriversberg Road & Vickers Road - Signalised control intersection.

Vickers Road & North Road - Signalised control intersection.

Southern Klipriversberg Road & East Street - Stop controlled with free flow on Southern Klipriversberg Road.

Plinlimmon Road & East Street - Stop controlled with free flow on Plinlimmon Road.

The above intersections were selected as it provides the main access to the study area, and the additional traffic that will be generated by the proposed development will have the highest impact on these intersections.

The lane configuration for the above intersections is appended in **Annexure C**.

## 5. TIME FRAME OF ANALYSIS

It is expected, that the development will generate more than 150 peak hour trips and the following traffic assessment scenarios were analysed:

Existing traffic demand (Base year 2012);

Existing traffic demand with development traffic;

Expected future (2017) background traffic demand, five years after the base year;

Expected future (2017) traffic demand, with development traffic.

## 6. DESIGN PEAK HOURS AND PEAK-HOUR FACTORS

### 6.1 DESIGN PEAK HOURS

Given the trip generation characteristics of the proposed development, the peak demand is during the weekday morning and weekday afternoon peak hours of the adjacent road network. The peak hours selected for this application is as follows:

Weekday morning peak hour (typical between 06:45 to 07:45); and

Weekday afternoon peak hour (typical between 16:30 to 17:30).

### 6.2 PEAK HOUR FACTORS

The following peak hour factors (PHF) were used in the capacity analysis and level-of-service (LOS) calculations:

Base year – peak hour factors obtained from the existing traffic counts.

For the future (2017) horizon, a PHF of 0.90 or LOS E was considered for a signalised controlled intersection. For unsignalised intersections a PHF of 0.85 was used.

## 7. GAUTENG TRANSPORT INFRASTRUCTURE ACT EVALUATION

The application was also evaluated in terms of the Gauteng Transport Infrastructure Act of 2001. Based on the provincial PWV Road Master Plan shown in **Figure 3**, the applicant site is not affected by any existing or future provincial roads.

## 8. BACKGROUND TRAFFIC DEMAND

### 8.1 BASE YEAR BACKGROUND TRAFFIC DEMAND

Detailed traffic counts were carried out at the intersection, during the weekday morning and afternoon, during November 2011. The peak hour background traffic volumes are shown in **Figure 4**.

### 8.2 IMPACT OF CHANGES TO ROAD NETWORK PLANNED BY THE ROAD AUTHORITIES

No road network changes are planned for the study area or road/s currently under construction that could impact on the findings of this applicant.

### 8.3 FUTURE YEAR BACKGROUND TRAFFIC DUE TO TRAFFIC GROWTH

For the purpose of this study, an annual growth rate of 3.0% was considered reasonable for the study area. The growth rate was used to determine the expected future target year through traffic volumes from the base year volumes. Therefore the annual growth rate compounded over 5 years yield an expected increase of 15.9% in the traffic volumes between base year and target year.

Given the existing weekday morning and weekday afternoon peak hour traffic volumes, refer to **Figure 4**, and the projected growth rate, the expected future target year peak hour traffic volumes were calculated, and are shown in **Figure 5**.

### 8.4 FUTURE TRAFFIC VOLUMES DEMAND DUE TO LATENT LAND USES

As indicate previously no new township applications were identified that could impact on the findings of this application.

# 9. PROPOSED DEVELOPMENT TRAFFIC

## 9.1 INTRODUCTION

As previously indicated the site is earmarked for 5 161 "Res 1 & 3" dwelling units, schools, community facilities and a retail component of 4 000m² GLA.

## 9.2 TRIP GENERATION BY PROPOSED DEVELOPMENT

The trip generation rates for the land uses were obtained from the ***South African Trip Generation Rates*** document. In addition to this the trip rates and commuter transport preferences as described in the ***Residential Trip Generation Variables for South Africa (dated November 2007)*** and the ***Gauteng Household Travel Survey*** were consulted. The results of the trip generation is summarised as follows:

**Residential**

Weekday morning peak hour: 0.5 trips/dwelling unit, with a directional split of 25:75 (in:out)

Weekday afternoon peak hour: 0.5 trips/dwelling unit, with a directional split of 75:25 (in:out)

The majority of the dwelling units are earmarked for RDP and BNG (Breaking New Ground) units, aimed at the entry level housing market. These property owners have low vehicle ownership and make use of public transport for daily commuting trips. In light of this, a reduction in the final trip rates was considered reasonable. The following trip generation reduction factors were assumed:

Low vehicle ownership = 30%

Mixed use = 15%

**Retail**

Weekday afternoon peak hour: 10.53 trips/100m² GLA, with a directional split of 50:50 (in:out)

Saturday midday peak hour: 16.94 trips/100m² GLA, with a directional split of 50:50 (in:out)

The retail development will be located adjacent to the new residential township and it can be expected that a large portion of the patronage will walk to the shop. In light of this, a reduction in the final trip rates was considered reasonable. The following trip generation reduction factors were assumed:

Low vehicle ownership = 30%

Mixed use = 10%

As described in the ***"South African Trip Generation Rates"*** it is assumed that some of the traffic generated

by the shopping centre is traffic intercepted from the adjacent road network – traffic already traveling on the system. A pass-by rate of 35% is recommended in the document. However, as part of this study the rate was no applied, due to the fact that reduction factors were already included in the trip rates to represent the geographical composition of the new residential area.

**Primary School**

Weekday morning peak hour: 0.9 trips/pupil, with a directional split of 50:50 (in:out)

Weekday afternoon peak hour: 0.4 trips/pupil, with a directional split of 45:55 (in:out)

The school will serve approximately 2 500 dwelling units, of which at least half is within walking distance of the school. In light of this, a reduction in the final trip rates was considered reasonable. The following trip generation reduction factors were assumed:

Low vehicle ownership = 50%

Mixed use = 30%

**Secondary School**

Weekday morning peak hour: 0.8 trips/pupil, with a directional split of 50:50 (in:out)

Weekday afternoon peak hour: 0.4 trips/pupil, with a directional split of 45:55 (in:out)

The school will serve approximately 2 500 dwelling units, of which at least half is within walking distance of the school. In light of this, a reduction in the final trip rates was considered reasonable. The following trip generation reduction factors were assumed:

Low vehicle ownership = 50%

Mixed use = 30%.

**Crèche, Religious Site & Community Centers**

Several crèches, religious sites and community centers are planned as part of the township. Given the location of these facilities, it will mainly cater for the local residents. The anticipated trip generation will mainly be restricted to walking. In light of this no further evaluation of the land uses was considered. It is, however, recommended that during the site development phase, aspects such as access layout design, parking layout, accommodation of pedestrian (sidewalks), etc be dealt with in more detail.

**Trip Summary**

The total trip generation is summarised in **Table 1**, with detailed calculations appended in **Annexure D.**

**Table 1: Total Trip Generation For Proposed Development**

| DESCRIPTION | MORNING PEAK HOUR | | | AFTERNOON PEAK HOUR | | | SATURDAY PEAK HOUR | | |
|---|---|---|---|---|---|---|---|---|---|
| | IN | OUT | TOTAL | IN | OUT | TOTAL | IN | OUT | TOTAL |
| Residential – East Section | 247 | 458 | 705 | 458 | 247 | 705 | - | - | - |
| Residential – East Section | 250 | 464 | 714 | 464 | 250 | 714 | - | - | - |
| Retail | - | - | - | 126 | 127 | 253 | 203 | 204 | 407 |
| Primary School | 135 | 135 | 270 | (54) | (66) | (120) | - | - | - |
| Secondary School | 282 | 230 | 512 | (115) | (141) | (256) | - | - | - |
| Total | 914 | 1 287 | 2 201 | 1 048<br>(169) | 624<br>(207) | 1 672<br>(376) | 203 | 204 | 407 |

Note: Values in bracket denotes midday traffic generated by the schools. Also note a PHF of 0.5 was applied to the trips generated by the schools – intense vehicle activities at schools are typically experienced over a shorter period of time.

From **Table 1**, it can be concluded that the impact of the main trip generators on the external road network is 2 201 (AM Peak), 376 (Midday Peak – School Traffic), 1 672 (PM Peak) and 407 (SAT Peak) peak hour trips. Given the expected peak hour demand on the external road network, the study only evaluated the weekday morning and weekday afternoon peak hours.

## 10. TRIP DISTRIBUTION AND ASSIGNMENT – PROPOSED DEVELOPMENT

### 10.1 TRIP DISTRIBUTION

The most likely direction from which the generated traffic will approach and leave the study area was determined by taking the following in consideration:

The location of the development in relation to main central business districts/residential areas; and

The existing traffic flows on the adjacent road network during the respective peak hours were used as an adaptation of the Analogy Method.

For the purpose of this application the following distribution was accepted (refer to **Annexure E**):

**Residential – Eastern Section**

Southern Klipriversberg Road – East = 10%

Southern Klipriversberg Road – West = 10%

Vickers Road - North = 25%

North Road – West = 10%

East Road – North = 5%

South Rand Road – West = 20%

South Rand Road – East = 10%

R59 (Sybrand van Niekerk Freeway) – South = 5%

Secondary Streets East of applicant site – 5%

**Residential – Western Section**

Southern Klipriversberg Road – East = 15%

Southern Klipriversberg Road – West = 10%

Vickers Road - North = 25%

North Road – West = 10%

East Road – North = 5%

South Rand Road – West = 20%

South Rand Road – East = 10%

R59 (Sybrand van Niekerk Freeway) – South = 5%

**Primary School**

Southern Klipriversberg Road – East: Inbound = 0%; Outbound = 10%

Southern Klipriversberg Road – West: Inbound = 0%; Outbound = 5%

Vickers Road – North: Inbound = 0%; Outbound = 20%

North Road – West: Inbound = 0%; Outbound = 5%

Aida Street – South: Inbound = 5%; Outbound = 5%

South Rand Road – West; Inbound = 0%; Outbound = 15%

South Rand Road – East: Inbound = 0%; Outbound = 10%

R59 (Sybrand van Niekerk Freeway) – South: Inbound = 0%; Outbound = 5%

Secondary Streets East of applicant site: Inbound = 10%; Outbound = 5%

Trips generated within the boundaries of Erf 1202 South Hills; Inbound = 15%; Outbound = 10%

Trips generated within the boundaries of South Hills Extension 2; Inbound = 70%; Outbound = 10%

**Secondary School**

Southern Klipriversberg Road – East: Inbound = 10%; Outbound = 10%

Southern Klipriversberg Road – West: Inbound = 5%; Outbound = 5%

Vickers Road – North: Inbound = 0%; Outbound = 20%

East Road – North: Inbound = 5%; Outbound = 5%

Johan Meyer Street – South: Inbound = 10%; Outbound = 5%

Aida Street – South: Inbound = 10%; Outbound = 5%

South Rand Road – West; Inbound = 0%; Outbound = 15%

South Rand Road – East: Inbound = 0%; Outbound = 10%

R59 (Sybrand van Niekerk Freeway) – South: Inbound = 0%; Outbound = 5%

Trips generated within the boundaries of Erf 1202 South Hills; Inbound = 40%; Outbound = 10%

Trips generated within the boundaries of South Hills Extension 2; Inbound = 20%; Outbound = 10%

**Retail**

East Road – North = 15%

Plinlimmon Road – North = 5%

Johan Meyer Street – South = 10%

Aida Street – South = 20%

South Rand Road – East = 5%

Trips originated from inside the residential area = 45%

### 10.2 TRIP ASSIGNMENT

Given the trip distributions, the expected traffic volumes that will be generated by the development, were assigned to the road network. The details are appended in **Annexure E**.

## 11. TOTAL TRAFFIC DEMAND

The total number of additional traffic that will be generated by the development is shown in **Figure 6**. The total estimated traffic volumes were determined by adding the development trips to the base year and target year background traffic. The details are shown in **Figures 7 and 8** for the base year and target year scenarios respectively.

## 12. CAPACITY ANALYSIS OF INTERSECTIONS

### 12.1 INTRODUCTION

The following methodology was adopted in evaluating the intersections included as part of this study:

Analysis the existing and future background traffic demand, using the existing intersection layout;

Determine the road upgrades required to accommodate the background traffic scenarios.

Analysis the expected base year and future year scenarios, taking the additional traffic that will be generated by the approved latent rights applicant site into consideration.

Determine the road upgrades required to accommodate the background traffic and the development trips. It was assumed, as part of this application, that the upgrades required to accommodate the background traffic will be implemented.

Analysis the expected base year and future year scenarios, taking the traffic that will be generated by the proposed development plus additional latent rights into consideration.

Determine the road upgrades required to accommodate the background traffic, approved latent rights and the development plus additional latent rights traffic. It was assumed, as part of this application, that the upgrades required to accommodate the approved rights traffic will be implemented.

The LOS for a traffic light controlled intersection is defined in terms of average total vehicle delay (not average stop delay), where delay is a measure of driver discomfort, frustration, fuel consumption and lost travel time. However, for an unsignalised intersection the average delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. The LOS for an approach values are based on the worst delay for any vehicle movements. The average intersection delay is not a good LOS measure for two-way control intersection, as the major through movements normally have a zero delay. The average intersection LOS is therefore recorded as “NOT APPLICABLE”.

## 12.2 IMPACT OF BASE YEAR AND FUTURE YEAR BACKGROUND TRAFFIC

The results of the capacity analysis for the background traffic for the base year (2012) and future year (2017) are summarised in **Tables 2 and 3**, with detailed results attached in **Annexure F**.

**Table 2: Capacity Analysis Results - Background Traffic (Base Year 2012)**

| INTERSECTION | PEAK HOUR | TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NORTHBOUND APPROACH | | | WESTBOUND APPROACH | | | SOUTHBOUND APPROACH | | | EASTBOUND APPROACH | | | INTERSECTION | | |
| | | S | D | L | S | D | L | S | D | L | S | D | L | S | D | L |
| South Rand & Johan Meyer/Plinlimmon | AM | 0.88 | 28.9 | C | >1.0 | 74.7 | E | 0.55 | 21.3 | C | 0.64 | 18.7 | B | >1.0 | 35.6 | D |
| | PM | 0.66 | 21.9 | C | 0.81 | 25.2 | C | >1.0 | 76.1 | E | 0.49 | 18.2 | B | >1.0 | 44.5 | D |
| South Rand & Aida | AM | 0.32 | 27.1 | D | 0.32 | 0.7 | N | - | - | - | 0.35 | 6.3 | N | 0.35 | 4.9 | N |
| | PM | 0.10 | 17.8 | C | 0.29 | 0.5 | N | - | - | - | 0.22 | 4.3 | N | 0.29 | 2.6 | N |
| South Rand/Nephin & Risana | AM | 0.60 | 20.3 | C | 0.08 | 1.5 | N | - | - | - | 0.42 | 6.2 | N | 0.60 | 10.0 | N |
| | PM | 0.57 | 17.8 | C | 0.29 | 4.5 | N | - | - | - | 0.48 | 11.5 | N | 0.57 | 10.4 | N |
| South Rand & Risana | AM | 0.31 | 13.7 | B | 0.39 | 16.1 | C | 0.24 | 4.7 | N | - | - | - | 0.39 | 10.3 | N |
| | PM | 0.03 | 13.9 | B | 0.72 | 19.7 | C | 0.33 | 7.5 | N | - | - | - | 0.72 | 12.5 | N |
| South Rand & R59 (Sybrand v Niekerk) | AM | 0.99 | 56.8 | E | 0.63 | 17.3 | B | - | - | - | 0.37 | 31.2 | C | 0.99 | 44.1 | D |
| | PM | 0.60 | 26.0 | C | >1.0 | 49.9 | D | - | - | - | 0.76 | 26.5 | C | >1.0 | 39.6 | D |
| Southern Kliprivers-berg & North/Nephin | AM | 0.84 | 26.4 | C | 0.84 | 15.2 | B | 0.25 | 9.4 | A | 0.95 | 37.8 | D | 0.95 | 21.5 | C |
| | PM | 0.14 | 19.2 | B | 0.38 | 11.8 | B | 0.61 | 11.2 | B | 0.52 | 21.4 | C | 0.61 | 13.7 | B |
| Southern Kliprivers-berg & Vickers | AM | - | - | - | 0.67 | 17.0 | B | 0.20 | 16.9 | B | 1.00 | 39.2 | D | 1.00 | 31.1 | C |
| | PM | - | - | - | 0.41 | 12.2 | B | >1.0 | >80 | F | 0.34 | 12.8 | B | >1.0 | >80 | F |
| Vickers & North | AM | 0.93 | 36.6 | D | 0.81 | 11.5 | B | 0.78 | 27.0 | C | 0.95 | 42.3 | D | 0.95 | 28.4 | C |
| | PM | 0.12 | 12.1 | B | 0.32 | 7.5 | A | 1.00 | 15.0 | B | 0.80 | 17.3 | B | 1.00 | 14.4 | B |
| Southern Kliprivers-berg & East (West Terminal) | AM | >1.0 | >50 | F | 0.19 | 2.5 | N | - | - | - | 0.46 | 4.2 | N | >1.0 | 20.3 | N |
| | PM | 0.32 | 22.3 | C | 0.56 | 3.2 | N | - | - | - | 0.14 | 17.0 | N | 0.56 | 6.6 | N |
| Southern Kliprivers-berg & East (East Terminal) | AM | - | - | - | 0.91 | 37.6 | N | 0.70 | >50 | F | 0.53 | 0.0 | N | 0.91 | 17.5 | N |
| | PM | - | - | - | 0.63 | 3.8 | N | 0.80 | 30.5 | D | 0.10 | 0.0 | N | 0.80 | 8.0 | N |
| Plinlimmon & East | AM | 0.77 | 8.9 | N | 0.26 | 15.7 | C | 0.14 | 4.0 | N | 0.24 | 29.7 | D | 0.77 | 9.7 | N |
| | PM | 0.09 | 3.3 | N | 0.58 | 17.3 | C | 0.25 | 1.3 | N | 0.10 | 25.8 | D | 0.58 | 7.8 | N |

**Table 2 continues….**

| LOS WITH PROPOSED ROAD UPGRADE | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South Rand & Johan Meyer/Plinlimmon | AM | 0.94 | 46.6 | D | 0.95 | 47.7 | D | 0.82 | 29.4 | C | 0.54 | 19.1 | B | 0.95 | 36.9 | D |
| | PM | 0.71 | 24.9 | C | 0.90 | 41.1 | D | 0.89 | 34.2 | C | 0.57 | 26.2 | C | 0.90 | 33.4 | C |
| South Rand & R59 (Sybrand v Niekerk) | AM | 0.77 | 17.8 | B | 0.62 | 16.9 | B | - | - | - | 0.56 | 36.9 | D | 0.77 | 20.0 | B |
| | PM | 0.55 | 27.0 | C | 0.57 | 10.8 | B | - | - | - | 0.58 | 18.5 | B | 0.58 | 16.4 | B |
| Southern Kliprivers-berg & Vickers | AM | - | - | - | 0.56 | 21.8 | C | 0.15 | 16.5 | B | 0.75 | 12.6 | B | 0.75 | 15.4 | B |
| | PM | - | - | - | 0.70 | 30.1 | C | 0.72 | 19.8 | B | 0.58 | 28.7 | C | 0.72 | 24.5 | C |

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS); LOS for Unsignalised Intersections = "N" denotes - NOT APPLICABLE

From **Table 2** it can be concluded that:

**South Rand Road & Johan Meyer Street/Plinlimmon Road**

The westbound approach on South Rand Road operates at a LOS E, during the weekday morning.

The southbound approach on Plinlimmon Road operates at a LOS E, during the weekday afternoon.

**South Rand Road & R59 (Sybrand van Niekerk Freeway)**

The northbound approach on the R59 operates at a LOS E, during the weekday morning.

The westbound approach on South Rand Road operates at a v/c exceeding 1.0, during the weekday afternoon.

**Southern Klipriversberg Road & Vickers Road**

The eastbound approach on Southern Klipriversberg Road operates at a v/c of 1.0, during the weekday afternoon.

The southbound approach on Vickers Road operates at a LOS F, during the weekday afternoon.

The intersection as a whole operates at a LOS F, during the weekday afternoon.

**Vickers Road & North Road**

The southbound approach on Vickers Road operates at a v/c of 1.0, during the weekday afternoon.

**Southern Klipriversberg Road & East Road (West Terminal)**

The northbound approach on East Road operates at a LOS F, during the weekday morning.

**Southern Klipriversberg Road & East Road (East Terminal)**

The southbound approach on East Road operates at a LOS F, during the weekday afternoon.

**Plinlimmon Road & East Road**

The detailed results and site observations indicated long queues on the westbound approach of East Road, during the weekday morning and weekday afternoon peak hours respectively. This is due to the poor operations at the South Rand Road/Plinlimmon Road intersection.

**Table 3: Capacity Analysis Results - Background Traffic (Target Year 2017)**

| INTERSECTION | PEAK HOUR | TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NORTHBOUND APPROACH | | | WESTBOUND APPROACH | | | SOUTHBOUND APPROACH | | | EASTBOUND APPROACH | | | INTERSECTION | | |
| | | S | D | L | S | D | L | S | D | L | S | D | L | S | D | L |
| South Rand & Johan Meyer/Plinlimmon | AM | >1.0 | >80 | F | >1.0 | >80 | F | 0.98 | 33.2 | C | 0.61 | 18.9 | B | >1.0 | >80 | F |
| | PM | >1.0 | 40.4 | D | >1.0 | >80 | F | >1.0 | >80 | F | 0.69 | 27.9 | C | >1.0 | >80 | F |
| South Rand & Aida | AM | 0.63 | 45.0 | E | 0.37 | 0.7 | N | - | - | - | 0.42 | 9.6 | N | 0.63 | 7.6 | N |
| | PM | 0.15 | 20.1 | C | 0.33 | 0.5 | N | - | - | - | 0.26 | 5.9 | N | 0.33 | 3.4 | N |
| South Rand/Nephin & Risana | AM | 0.94 | >50 | F | 0.10 | 1.6 | N | - | - | - | 0.53 | 7.3 | N | 0.94 | 22.5 | N |
| | PM | 0.91 | 38.7 | E | 0.36 | 4.5 | N | - | - | - | 0.73 | 17.9 | N | 0.91 | 18.2 | N |
| South Rand & Risana | AM | 0.38 | 15.3 | C | 0.50 | 18.9 | C | 0.28 | 4.7 | N | - | - | | 0.50 | 11.5 | N |
| | PM | 0.04 | 15.1 | C | 0.92 | 32.4 | D | 0.39 | 7.5 | N | - | - | - | 0.92 | 17.6 | N |
| South Rand & R59 (Sybrand v Niekerk) | AM | 0.95 | 26.3 | C | 0.63 | 15.3 | B | - | - | - | 0.63 | 35.2 | D | 0.95 | 24.8 | C |
| | PM | 0.73 | 30.5 | C | 0.70 | 11.2 | B | - | - | - | 0.71 | 19.2 | B | 0.73 | 17.7 | B |
| Southern Klipriversberg & North/Nephin | AM | 0.99 | 51.9 | D | 0.98 | 14.5 | B | 0.29 | 9.5 | A | >1.0 | >80 | F | >1.0 | 44.8 | D |
| | PM | 0.19 | 20.5 | C | 0.46 | 12.0 | B | 0.71 | 11.9 | B | 0.61 | 22.2 | C | 0.71 | 14.3 | B |
| Southern Klipriversberg & Vickers | AM | - | - | - | 0.36 | 7.5 | A | 0.53 | 31.0 | C | 1.00 | 12.5 | B | 1.00 | 13.3 | B |
| | PM | - | - | - | 0.83 | 35.7 | D | 0.84 | 25.2 | C | 0.67 | 29.6 | C | 0.84 | 28.8 | C |
| Vickers & North | AM | >1.0 | >80 | F | 1.00 | 58.4 | E | 0.92 | 28.3 | C | >1.0 | >80 | F | >1.0 | >80 | F |
| | PM | 0.20 | 13.3 | B | 0.43 | 8.8 | A | 1.00 | 18.0 | B | 0.99 | 52.1 | D | 1.00 | 23.3 | C |
| Southern Klipriversberg & East (West Terminal) | AM | >1.0 | >50 | F | 0.22 | 2.5 | N | - | - | - | 0.54 | 6.3 | N | >1.0 | >50 | N |
| | PM | 0.51 | 30.3 | D | 0.65 | 3.2 | N | - | - | - | 0.19 | 30.2 | N | 0.65 | 9.2 | N |

**Table 3 continues….**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Southern Kliprivers- | AM | - | - | - | >1.0 | >50 | F | >1.0 | >50 | F | 0.61 | 0.0 | N | >1.0 | >50 | N |
| berg & East (East Terminal) | PM | - | - | - | 0.74 | 6.0 | N | >1.0 | >50 | F | 0.12 | 0.0 | N | >1.0 | 38.3 | N |
| Plinlimmon & East | AM | 0.94 | 8.9 | N | 0.48 | 21.8 | C | 0.18 | 5.2 | N | 0.65 | >50 | F | 0.94 | 12.6 | N |
| | PM | 0.11 | 3.5 | N | 0.77 | 22.2 | C | 0.30 | 1.7 | N | 0.23 | 36.7 | E | 0.77 | 10.0 | N |
| **LOS WITH PROPOSED ROAD UPGRADE** | | | | | | | | | | | | | | | | |
| South Rand & Johan | AM | 0.88 | 30.1 | C | 0.93 | 23.2 | C | 0.85 | 28.7 | C | 0.88 | 36.7 | D | 0.88 | 29.9 | C |
| Meyer/Plinlimmon | PM | 0.73 | 20.9 | C | 0.86 | 34.2 | C | 0.86 | 25.8 | C | 0.81 | 35.3 | D | 0.86 | 29.0 | C |
| South Rand/Nephin & | AM | 0.60 | 17.3 | C | 0.10 | 1.6 | N | - | - | - | 0.53 | 7.2 | N | 0.60 | 9.6 | N |
| Risana | PM | 0.67 | 17.7 | C | 0.36 | 4.5 | N | - | - | - | 0.73 | 17.8 | N | 0.73 | 12.5 | N |
| Southern Kliprivers- | AM | 0.78 | 35.0 | D | 0.95 | 28.4 | C | 0.29 | 11.1 | B | 0.80 | 30.7 | C | 0.95 | 26.5 | C |
| berg & North/Nephin | PM | 0.16 | 21.8 | C | 0.50 | 24.6 | C | 0.67 | 15.4 | B | 0.46 | 24.0 | C | 0.67 | 20.1 | C |
| Southern Kliprivers- | | - | - | - | 0.40 | 9.1 | A | 0.39 | 25.6 | C | 0.54 | 7.5 | A | 0.54 | 9.9 | A |
| berg & Vickers | | - | - | - | 0.73 | 28.6 | C | 0.73 | 21.3 | C | 0.59 | 20.7 | C | 0.73 | 22.9 | C |
| Vickers & North | AM | 0.71 | 234 | C | 0.80 | 21.2 | C | 0.92 | 29.4 | C | 0.85 | 37.8 | D | 0.92 | 26.8 | C |
| | PM | 0.28 | 23.9 | C | 0.43 | 18.2 | B | 0.93 | 21.6 | C | 0.86 | 33.9 | C | 0.93 | 23.8 | C |

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS); LOS for Unsignalised Intersections = "N" denotes - NOT APPLICABLE

From **Table 3** it can be concluded that:

**South Rand Road & Johan Meyer Street/Plinlimmon Road**

Several approaches and the intersection as a whole will operate at v/c exceeding 1.0 and LOS exceeding E, during the weekday morning and weekday afternoon respectively.

**South Rand Road & Aida Street**

The northbound approach on Aida Street will operate at a LOS E, during the weekday morning.

**South Rand Road/Nephin Road & Risana Avenue**

The northbound approach on Risana Avenue will operate at a LOS F and E, during the weekday morning and weekday afternoon respectively.

**Southern Klipriversberg Road & North Street/Nephin Street**

The eastbound approach on Southern Klipriversberg Road will operate at a LOS F, during the weekday morning.

**Southern Klipriversberg Road & Vickers Road**

The eastbound approach on Southern Klipriversberg Road will operate at a v/c of 1.0, during the weekday morning.

**Vickers Road & North Street**

Several approaches and the intersection as a whole will operate at v/c exceeding 1.0 and LOS exceeding E, during the weekday morning and weekday afternoon respectively.

**Southern Klipriversberg Road & East Road (West Terminal)**

The northbound approach on East Road will operate at a LOS F, during the weekday morning.

**Southern Klipriversberg Road & East Road (East Terminal)**

Several approaches and the intersection as a whole will operate at v/c exceeding 1.0 and LOS exceeding E, during the weekday morning and weekday afternoon respectively.

**Plinlimmon Road & East Road**

The eastbound approach on East Road will operate at a LOS F and E, during the weekday morning and weekday afternoon respectively.

## 12.3 PROPOSED ROAD UPGRADES TO ACCOMMODATE BACKGROUND TRAFFIC

In order to determine the required road upgrading, a level-of-service E or worse on any approach at an intersection was accepted at the stage when road upgrading will be implemented. Based on the results summarised in **Tables 2 and 3**, and the field observations carried out, the following road upgrades are recommended (also refer to **Annexure C** for details):

**South Rand Road & Plinlimmon Road/Johan Meyer Street**

Provide an exclusive right-turn lane (storage capacity = 60m) on the northbound approach of Johan Meyers Street.

Provide an exclusive right-turn lane (storage capacity = 60m) on the westbound approach of South Rand Road.

Optimise the traffic signal settings.

**South Rand Road & Aida Street**

No road upgrades recommended.

**South Rand Road & Risana Avenue/Nephin Street**

Provide an exclusive slip lane (storage capacity = 60m) on the northbound approach of Risana Avenue.

**South Rand Road & R59 (Sybrand van Niekerk Freeway)**

Provide an exclusive third right-turn lane (storage capacity = 120m) on the northbound approach of the R59.

Provide a third lane on the eastbound approach (storage capacity = 120m) on South Rand Road, downstream of the intersection.

Convert the existing slip lane to a continuous slip lane on the westbound approach of South Rand Road, and extend lane for 100m downstream of the intersection.

Optimise the traffic signal settings.

**Southern Klipriversberg Road & North Road/Nephin Road**

Provide an exclusive right-turn lane (storage capacity = 40m) on the northbound approach of Nephin Road.

Increase the storage length of the existing right-turn lane on the eastbound and westbound approaches of Southern Klipriversberg Road to 60m.

Optimise the traffic signal settings.

**Southern Klipriversberg Road & Vickers Road**

Convert the exclusive left-turn lane on the southbound approach of Vickers Road to a shared left slip and right-turn lane. To accommodate the additional right-turn lane, provide a lane (storage capacity = 60m) downstream of the westbound approach of the intersection.

Convert the exclusive left-turn lane on the westbound approach of Southern Klipriversberg Road to a continuous slip.

Optimise the traffic signal settings.

**Vickers Road & North Street**

Provide an exclusive slip lane (storage capacity = 60m) on the eastbound approach of North Street.

Increase the storage length of the existing left-turn lane on the southbound approach of Vickers Road to 100m.

Provide an exclusive right-turn lane (storage capacity = 90m) on the westbound approach of North Street.

Optimise the traffic signal settings.

**Southern Klipriversberg Road & East Road (West Terminal)**

The capacity problems are experienced for a short period, and no road upgrades recommended. AT present the installation of a traffic signal is not yet warranted.

**Southern Klipriversberg Road & East Road (East Terminal)**

The capacity problems are experienced for a short period, and no road upgrades recommended. AT present the installation of a traffic signal is not yet warranted.

**Plinlimmon Road & East Road**

The capacity problems are experienced for a short period, and no road upgrades recommended. The road improvements recommended at the South Rand Road/Johan Meyers Street/Plinlimmon Road intersection will provide some improvement.

## 12.4 IMPACT OF BASE YEAR AND FUTURE YEAR DEVELOPMENT TRAFFIC

The results of the capacity analysis for the background traffic plus the development traffic, for the base year and future year are summarised in **Tables 4 and 5**, with detailed results attached in **Annexure F**.

**Table 4: Capacity Analysis Results – With Development Traffic (Base Year 2012)**

| INTERSECTION | PEAK HOUR | TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NORTHBOUND APPROACH | | | WESTBOUND APPROACH | | | SOUTHBOUND APPROACH | | | EASTBOUND APPROACH | | | INTERSECTION | | |
| | | S | D | L | S | D | L | S | D | L | S | D | L | S | D | L |
| South Rand & Johan Meyer/Plinlimmon | AM | >1.0 | >80 | F | >1.0 | >80 | F | 1.00 | 35.2 | D | 0.61 | 17.7 | B | >1.0 | >80 | F |
| | PM | >1.0 | 40.3 | D | >1.0 | >80 | F | >1.0 | >80 | F | 0.70 | 23.9 | C | >1.0 | 68.7 | E |
| South Rand & Aida | AM | 0.62 | 40.9 | D | 0.67 | 13.8 | B | 0.62 | 41.3 | D | 0.63 | 9.7 | A | 0.67 | 18.2 | B |
| | PM | 0.39 | 42.7 | D | 0.44 | 6.3 | A | 0.42 | 44.7 | D | 0.42 | 5.7 | A | 0.44 | 11.2 | B |
| South Rand/Nephin & Risana | AM | >1.0 | >80 | F | 0.27 | 1.9 | N | - | - | - | 0.80 | 18.0 | N | >1.0 | >50 | N |
| | PM | >1.0 | >80 | F | 0.38 | 4.1 | N | - | - | - | 0.79 | 21.0 | N | >1.0 | >50 | N |
| South Rand & Risana | AM | 0.40 | 18.3 | C | 0.73 | 27.1 | D | 0.38 | 6.0 | N | - | - | - | 0.73 | 14.1 | N |
| | PM | 0.03 | 14.8 | B | >1.0 | >50 | F | 0.38 | 7.6 | N | - | - | - | >1.0 | 40.9 | N |

**Table 4 continues….**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South Rand & R59 | AM | 0.83 | 20.2 | C | 0.64 | 16.5 | B | - | - | - | 0.69 | 36.2 | D | 0.83 | 21.9 | C |
| (Sybrand v Niekerk) | PM | 0.63 | 28.8 | C | 0.62 | 11.2 | B | - | - | - | 0.62 | 17.3 | B | 0.63 | 16.8 | B |
| Southern Kliprivers- | AM | >1.0 | >80 | F | 0.84 | 14.8 | B | 0.25 | 10.5 | B | >1.0 | >80 | F | >1.0 | >80 | F |
| berg & North/Nephin | PM | 0.66 | 24.9 | C | 0.39 | 12.2 | B | 0.86 | 15.9 | B | 0.76 | 24.9 | C | 0.86 | 17.6 | B |
| Southern Kliprivers- | AM | 0.31 | 33.2 | C | 0.47 | 10.2 | B | 0.44 | 29.6 | C | 0.52 | 7.8 | A | 0.52 | 12.8 | B |
| berg & Vickers | PM | 0.06 | 10.6 | B | 0.88 | 40.7 | D | 0.87 | 24.1 | C | 0.75 | 26.0 | C | 0.88 | 27.9 | C |
| Vickers & North | AM | >1.0 | >80 | F | >1.0 | 68.5 | E | 1.00 | 24.8 | C | >1.0 | >80 | F | >1.0 | >80 | F |
| | PM | 0.18 | 11.3 | B | 0.43 | 8.7 | B | 1.00 | 16.3 | B | 0.90 | 24.5 | C | 1.00 | 16.6 | B |
| Southern Kliprivers- | AM | 0.86 | 40.5 | D | 0.78 | 16.8 | B | 0.51 | 29.1 | C | 0.84 | 26.4 | C | 0.86 | 25.6 | C |
| berg & East | PM | 0.18 | 26.8 | C | 0.42 | 11.0 | B | 0.41 | 21.1 | C | 0.37 | 27.7 | C | 0.42 | 16.2 | B |
| Plinlimmon & East | AM | 0.80 | 9.0 | N | 0.30 | 15.6 | C | 0.14 | 4.0 | N | 0.25 | 30.9 | D | 0.80 | 9.8 | N |
| | PM | 0.10 | 3.8 | N | 0.61 | 17.8 | C | 0.26 | 1.5 | N | 0.11 | 26.8 | D | 0.61 | 8.2 | N |
| **LOS WITH PROPOSED ROAD UPGRADE** | | | | | | | | | | | | | | | | |
| South Rand & Johan | AM | 0.76 | 26.8 | C | 0.90 | 27.5 | C | 0.88 | 29.4 | C | 0.70 | 21.8 | C | 0.90 | 26.2 | C |
| Meyer/Plinlimmon | PM | 0.62 | 22.3 | C | 0.84 | 30.4 | C | 0.86 | 25.2 | C | 0.83 | 33.1 | C | 0.86 | 28.0 | C |
| South Rand/Nephin & | AM | 0.65 | 20.9 | C | 0.64 | 22.3 | C | - | - | - | 0.66 | 9.8 | A | 0.66 | 16.0 | B |
| Risana | PM | 0.61 | 16.5 | B | 0.63 | 7.4 | A | - | - | - | 0.69 | 10.1 | B | 0.69 | 11.0 | B |
| South Rand & Risana | AM | 0.55 | 17.6 | C | 0.17 | 8.3 | N | 0.28 | 8.7 | A | - | - | - | 0.55 | 11.1 | N |
| | PM | 0.56 | 17.3 | C | 0.31 | 8.3 | N | 0.35 | 8.0 | A | - | - | - | 0.35 | 8.3 | N |
| Southern Kliprivers- | AM | 0.89 | 30.4 | C | 0.86 | 31.5 | C | 0.25 | 11.9 | B | 0.90 | 37.1 | D | 0.90 | 28.5 | C |
| berg & North/Nephin | PM | 0.24 | 22.8 | C | 0.63 | 26.7 | C | 0.65 | 13.6 | B | 0.62 | 25.5 | C | 0.65 | 20.6 | C |
| Vickers & North | AM | 0.71 | 22.9 | C | 0.82 | 22.5 | C | 0.79 | 22.4 | C | 0.81 | 31.0 | C | 0.82 | 24.3 | C |
| | PM | 0.57 | 43.6 | D | 0.38 | 15.6 | B | 0.83 | 18.7 | B | 0.82 | 27.9 | C | 0.83 | 21.9 | C |

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS); LOS for Unsignalised Intersections = "N" denotes - NOT APPLICABLE

From **Table 4** it can be concluded that:

**South Rand Road & Plinlimmon Road**

Several approaches and the intersection as a whole will operate at v/c exceeding 1.0 and LOS exceeding E, during the weekday morning and weekday afternoon respectively.

**South Rand Road & Nephin Road/Risana Avenue**

The northbound approach on Risana Avenue will operate at a LOS F, during the weekday morning and

weekday afternoon respectively.

The intersection as a whole will operate at a LOS F, during the weekday morning and weekday afternoon peak hours respectively.

**South Rand Road & Risana Avenue**

The westbound approach on South Rand Road will operate at a LOS F, during the weekday afternoon.

**Southern Klipriversberg Road & North Street/Nephin Street**

The northbound approach on Nephin Road will operate at a LOS F, during the weekday morning.

The eastbound approach on Southern Klipriversberg Road will operate at a LOS F, during the weekday morning.

The intersection as a whole will operate at a LOS F, during the weekday morning.

**Vickers Road & North Street**

Several approaches and the intersection as a whole will operate at v/c exceeding 1.0 and LOS exceeding E, during the weekday morning and weekday afternoon respectively.

**Southern Klipriversberg Road & East Road (East & West Terminal combined)**

The LOS illustrated, is based on certain road upgrades proposed for the intersection.

**Table 5: Capacity Analysis Results – With Development Traffic (Target Year 2017)**

| INTERSECTION | PEAK HOUR | TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NORTHBOUND APPROACH | | | WESTBOUND APPROACH | | | SOUTHBOUND APPROACH | | | EASTBOUND APPROACH | | | INTERSECTION | | |
| | | S | D | L | S | D | L | S | D | L | S | D | L | S | D | L |
| South Rand & Johan Meyer/Plinlimmon | AM | 1.00 | 42.8 | D | 0.97 | 34.1 | C | 1.00 | 30.6 | C | >1.0 | >80 | F | >1.0 | 58.2 | E |
| | PM | >1.0 | 48.0 | D | >1.0 | 54.5 | D | 0.97 | 39.7 | D | >1.0 | 85.7 | F | >1.0 | 55.0 | D |
| South Rand & Aida | AM | 0.80 | 49.4 | D | 0.82 | 16.1 | B | 0.66 | 43.2 | D | 0.70 | 9.9 | A | 0.82 | 19.5 | B |
| | PM | 0.50 | 44.8 | D | 0.49 | 6.1 | A | 0.48 | 46.3 | D | 0.46 | 5.4 | A | 0.50 | 10.8 | B |
| South Rand/Nephin & Risana | AM | 0.76 | 22.2 | C | 0.80 | 30.8 | C | - | - | - | 0.80 | 13.5 | B | 0.80 | 20.4 | C |
| | PM | 0.75 | 17.4 | B | 0.72 | 8.3 | A | - | - | - | 0.81 | 17.1 | B | 0.81 | 13.9 | B |
| South Rand & Risana | AM | 0.71 | 22.0 | C | 0.19 | 8.3 | N | 0.30 | 8.9 | A | - | - | - | 0.71 | 12.5 | N |
| | PM | 0.90 | 20.1 | C | 0.35 | 8.3 | N | 0.40 | 8.1 | A | - | - | - | 0.40 | 8.4 | N |

**Table 5 continues….**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South Rand & R59 | AM | 0.92 | 26.0 | C | 0.78 | 17.9 | B | - | - | - | 0.87 | 42.0 | D | 0.92 | 26.6 | C |
| (Sybrand v Niekerk) | PM | 0.73 | 30.5 | C | 0.70 | 11.2 | B | - | - | - | 0.71 | 19.2 | B | 0.73 | 17.7 | B |
| Southern Kliprivers- | AM | 0.91 | 41.9 | D | 0.95 | 38.8 | D | 0.34 | 13.0 | B | 0.92 | 37.3 | D | 0.95 | 34.2 | C |
| berg & North/Nephin | PM | 0.31 | 23.6 | C | 0.71 | 27.7 | C | 0.73 | 14.1 | B | 0.74 | 27.3 | C | 0.74 | 21.4 | C |
| Southern Kliprivers- | AM | 0.31 | 33.2 | C | 0.53 | 11.0 | B | 0.51 | 29.4 | C | 0.60 | 8.0 | A | 0.60 | 12.8 | B |
| berg & Vickers | PM | 0.17 | 30.8 | C | 0.85 | 35.1 | D | 0.88 | 21.3 | C | 0.71 | 22.7 | C | 0.88 | 25.2 | C |
| Vickers & North | AM | 0.80 | 25.8 | C | 0.95 | 47.2 | D | >1.0 | 47.0 | D | >1.0 | 78.4 | E | >1.0 | 47.0 | D |
| | PM | 0.70 | 48.0 | D | 0.52 | 15.3 | B | 1.00 | 22.2 | C | 0.98 | 60.2 | E | 1.00 | 30.4 | C |
| Southern Kliprivers- | AM | 0.95 | 53.3 | D | 0.86 | 20.4 | C | 0.61 | 31.6 | C | 0.98 | 49.1 | D | 0.98 | 38.2 | D |
| berg & East | PM | 0.21 | 27.1 | C | 0.49 | 11.3 | B | 0.47 | 21.2 | C | 0.38 | 26.1 | C | 0.49 | 16.1 | B |
| Plinlimmon & East | AM | 0.97 | 8.9 | N | 0.49 | 21.7 | C | 0.18 | 5.2 | N | 0.69 | >50 | F | 0.97 | 13.1 | N |
| | PM | 0.15 | 4.2 | N | 0.80 | 22.1 | C | 0.30 | 1.8 | N | 0.25 | 40.0 | E | 0.80 | 10.3 | N |
| **LOS WITH PROPOSED ROAD UPGRADE** | | | | | | | | | | | | | | | | |
| South Rand & Johan | AM | 0.92 | 43.5 | D | 0.93 | 47.1 | D | 0.86 | 38.3 | D | 0.87 | 40.3 | D | 0.93 | 42.8 | D |
| Meyer/Plinlimmon | PM | 0.80 | 34.7 | C | 0.93 | 34.2 | C | 0.94 | 44.4 | D | 0.72 | 27.5 | C | 0.94 | 36.5 | D |
| Vickers & North | AM | 0.86 | 39.6 | D | 0.97 | 48.0 | D | 0.52 | 18.7 | B | 0.81 | 38.8 | D | 0.97 | 39.1 | D |
| | PM | 0.66 | 44.6 | D | 0.47 | 26.9 | C | 0.86 | 25.1 | C | 0.75 | 21.1 | C | 0.86 | 25.9 | C |
| Plinlimmon & East | AM | 0.63 | 6.5 | N | 0.30 | 12.9 | B | 0.17 | 0.8 | N | 0.06 | 15.0 | C | 0.63 | 6.6 | N |
| | PM | 0.16 | 4.6 | N | 0.80 | 23.6 | C | 0.29 | 0.4 | N | 0.01 | 11.6 | B | 0.80 | 9.5 | N |

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS); LOS for Unsignalised Intersections = "N" denotes - NOT APPLICABLE

From **Table 5** it can be concluded that:

**South Rand Road & Plinlimmon Road**

Several approaches and the intersection as a whole will operate at v/c exceeding 1.0 and LOS exceeding E, during the weekday morning and weekday afternoon respectively.

**Vickers Road & North Street**

Several approaches and the intersection as a whole will operate at v/c exceeding 1.0 and LOS exceeding E, during the weekday morning and weekday afternoon respectively.

## 12.5 PROPOSED ROAD UPGRADES TO ACCOMMODATE DEVELOPMENT TRAFFIC

In order to determine the required road upgrading, a level-of-service E or worse on any approach at an intersection was accepted at the stage when road upgrading will be implemented. Based on the results

summarised in **Tables 4 and 5**, the following road upgrades are recommended (also refer to **Annexure C** for details):

**South Rand Road & Plinlimmon Road/Johan Meyer Street**

Provide an exclusive right-turn lane (storage capacity = 60m) on the northbound approach of Johan Meyers Street.

Provide an exclusive right-turn lane (storage capacity = 60m) on the eastbound approach of South Rand Road.

Provide a shared through and slip lane on the southbound approach of Plinlimmon Road.

Provide an exclusive right-turn lane (storage capacity = 60m) on the westbound approach of South Rand Road.

Optimise the traffic signal settings.

**South Rand Road & Aida Street/Camel Thorn Street**

Provide an exclusive right-turn lane (storage capacity = 60m) on the eastbound approach of South Rand Road.

Provide an exclusive right-turn lane (storage capacity = 60m) on the southbound approach of Camel Thorn Street.

Provide a shared through and left-turn lane on the southbound approach of Camel Thorn Street.

Provide an exclusive right-turn lane (storage capacity = 60m) on the westbound approach of South Rand Road.

Install a traffic signal.

**South Rand Road & Risana Avenue/Nephin Street**

Provide an exclusive slip lane (storage capacity = 60m) on the northbound approach of Risana Avenue.

Provide an exclusive right-turn lane (storage capacity = 60m) on the eastbound approach of South Rand Road.

Provide a slip on the westbound approach of South Rand Road.

Install a traffic signal.

**South Rand Road & Risana Avenue**

Provide an exclusive slip lane (storage capacity = 60m) on the southbound approach Risana Avenue.

**South Rand Road & R59 (Sybrand van Niekerk Freeway)**

Optimise traffic signal settings.

**Southern Klipriversberg Road & North Road/Nephin Road**

Provide an exclusive left-turn lane (storage capacity = 60m) on the northbound approach of Nephin Road.

Increase the storage length of the existing right-turn lane on the eastbound and westbound approaches of Southern Klipriversberg Road to 60m.

Optimise the traffic signal settings.

**Southern Klipriversberg Road & Vickers Road/Leadwood Road**

Provide an exclusive right-turn lane (storage capacity = 60) on the northbound approach of Leadwood Road.

Provide a shared left-turn lane and through lane on the northbound approach of Leadwood Road.

Convert the exclusive left-turn lane on the westbound approach of Southern Klipriversberg Road to a continuous slip.

Provide a 2nd right-turn lane (storage capacity = 60m) on the southbound approach of Vickers Road.

Convert the exclusive left-turn lane on the southbound approach of Vickers Road to a shared left slip and right-turn lane. To accommodate the additional right-turn lane, provide a lane (storage capacity = 60m) downstream of the westbound approach of the intersection.

Optimise the traffic signal settings.

**Vickers Road & North Street**

Provide an exclusive slip lane (storage capacity = 60m) on the eastbound approach of North Street.

Provide an exclusive right-turn lane (storage capacity = 60m) on the eastbound approach of North Street.

Provide a 2nd right-turn lane (storage capacity = 75m) on the southbound approach of Vickers Road. To accommodate the additional right-turn lane, provide a lane (storage capacity = 60m) downstream of the

eastbound approach of the intersection.

Increase the storage length of the existing left-turn lane on the southbound approach of Vickers Road to 100m.

Provide a 2nd right-turn lane on the (storage capacity = 120m) on the westbound approach of North Street.

Optimise the traffic signal settings.

**Southern Klipriversberg Road & East Road**

Align the northern and southern approaches of East Road.

Provide an exclusive right-turn lane (storage capacity = 60m) on the northbound approach of East Road.

Provide an exclusive right-turn lane (storage capacity = 60m) on the eastbound approach of Southern Klipriversberg Road.

Provide a 2nd through lane (storage capacity = 60m) on the eastbound approach of Southern Klipriversberg Road. To accommodate the additional through lane, the lane should be extended for 120m downstream of the intersection.

The southbound approach of East Road should be redesign to allow for an exclusive right-turn lane (storage capacity = 60m), a through lane and an exclusive slip lane (storage capacity = 60m).

Provide an exclusive right-turn lane (storage capacity = 60m) on the westbound approach of Southern Klipriversberg Road.

Provide a 2nd through lane (storage capacity = 90m) on the westbound approach of Southern Klipriversberg Road. To accommodate the additional through lane, the lane should be extended for 120m downstream of the intersection.

Provide an exclusive slip lane on the (storage capacity = 60m) on the westbound approach of Southern Klipriversberg Road.

Install a traffic signal.

**Plinlimmon Road & East Road**

Convert the four legged intersection to a partial intersection.

# 13. TOWNSHIP ROAD NETWORK AND ACCESS POINTS

## 13.1 PROPOSED EXTERNAL ACCESS POINTS

The main access points for the township will be provided from South Rand Road, Nephin Road Southern Klipriversberg Road and East Road, as indicated on the proposed township layout, appended in **Annexure A**.

The access arrangements for the portions of land can be summarised as follows:

**ERF 1202 SOUTH HILLS (also refer to Annexure A)**

Direct access from Nephin Road, at the following intersections:

Lily Road, directly opposite Frank Street

Wax Flower Road, directly opposite Messina Street

Snapdragon Road, directly opposite Winburn Street

Buttercup Road, directly opposite Coalbrook Street

Columbine Road, directly opposite Kinahan Road

**PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2 (also refer to Annexure A)**

From South Rand Road, at Camel Thorn Road, directly opposite Aida Street

From East Road, at Milkwood Road, Buffalo Thorn Road and Weeping Willow Road.

From Southern Klipriversberg Road, at Boabab Road.

From Southern Klipriversberg Road, at Leadwood Road, directly opposite Vickers Road.

## 13.2 EXISTING INTERNAL ROAD NETWORK

With the exception of the sports fields and Pickitup site, the remaining area is undeveloped and is served by footpaths and informal dirt roads. No formal road infrastructure is provided to serve the sports field. The Pickitup site is served by a surfaced road from East Road. Thus limited infrastructure exists to serve the proposed development.

## 13.3 PROPOSED INTERNAL ROAD NETWORK

The two portions of land will be served by a network of paved Class U4 and Class U5 roads. These roads will all comprise of one lane per direction. The road reserve widths for these roads vary between 10.5m, 13.0m and 16.0m, as illustrated in the township layout appended in **Annexure A**.

The surfaced road width should comprise of two lane roads, with the following requirements:

10.5m Road reserves = 5.0m road widths

13.0m road reserves = 6.0m road widths

16.0m road reserves = 7.0m.

No access restrictions are proposed along these roads.

## 13.4 EVALUATION OF THE INTERNAL ROAD NETWORK

As part of the application, certain main internal intersections were also evaluated. The purpose of the assessment is to determine whether the proposed internal road network has sufficient capacity to accommodate the expected development traffic.

The following additional intersections were analysed:

Nephin Road & Wax Flower Road/Steelpoort Street

East Road & Milkwood Road

Milkwood Road & Camel Thorn Road

Southern Klipriversberg Road & Boabab Road

The traffic volumes used for the assessment is shown in **Figure 9**.

The results of the Sidra capacity analysis for the above intersections are summarised in **Table 6**, with detail results attached in **Annexure F**.

**Table 6: Capacity Analysis Results – Internal Road Network (Target Year 2017)**

| INTERSECTION | PEAK HOUR | TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NORTHBOUND APPROACH | | | WESTBOUND APPROACH | | | SOUTHBOUND APPROACH | | | EASTBOUND APPROACH | | | INTERSECTION | | |
| | | S | D | L | S | D | L | S | D | L | S | D | L | S | D | L |
| Nehpin & Wax Flower /Steelpoort | AM | 0.26 | 3.6 | N | 0.58 | 33.7 | D | 0.18 | 4.5 | N | 0.65 | 22.3 | C | 0.65 | 11.2 | N |
| | PM | 0.15 | 8.5 | N | 0.48 | 33.0 | D | 0.40 | 2.2 | N | 0.19 | 17.6 | C | 0.48 | 6.8 | N |
| East & Milkwood | AM | 0.29 | 0.2 | N | 0.51 | 32.4 | D | 0.17 | 5.7 | N | 0.05 | 21.0 | C | 0.51 | 6.1 | N |
| | PM | 0.06 | 1.6 | N | 0.06 | 16.9 | C | 0.26 | 1.4 | N | 0.03 | 15.7 | C | 0.26 | 2.6 | N |

**Table 6 continues….**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Milkwood & | AM | 0.10 | 5.8 | N | - | - | - | 0.15 | 3.6 | N | 0.33 | 16.1 | C | 0.33 | 7.9 | N |
| Camel Thorn | PM | 0.07 | 3.1 | N | - | - | - | 0.09 | 4.8 | N | 0.11 | 12.7 | B | 0.11 | 6.2 | N |
| Southern Kliprivers- | AM | >1.0 | >50 | F | 0.40 | 0.3 | N | - | - | - | 0.82 | 0.1 | N | >1.0 | 16.0 | N |
| berg & Boabab | PM | 1.0 | >50 | F | 0.70 | 1.0 | N | - | - | - | 0.30 | 1.0 | N | 1.00 | 6.1 | N |
| **LOS WITH PROPOSED ROAD UPGRADE** | | | | | | | | | | | | | | | | |
| Southern Kliprivers- | AM | 0.72 | 52.0 | D | 0.37 | 3.2 | A | - | - | - | 0.77 | 4.8 | A | 0.77 | 6.2 | A |
| berg & Boabab | PM | 0.28 | 48.6 | D | 0.68 | 4.4 | A | - | - | - | 0.28 | 3.3 | A | 0.68 | 4.9 | A |

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS); LOS for Unsignalised Intersections = "N" denotes - NOT APPLICABLE

From **Table 6** it can be concluded that:

**Nephin Road & Wax Flower Road/Steelpoort Road**

The intersection will operate at acceptable LOS, provided the layout shown in **Figure 10** is constructed.

**East Road & Milkwood Road**

The intersection will operate at acceptable LOS, provided the layout shown in **Figure 10** is constructed.

**Camel Thorn Road & Milkwood Road**

The intersection will operate at acceptable LOS, provided the layout shown in **Figure 10** is constructed.

**Southern Klipriversberg Road & Boabab Road**

The northbound approach on Boabab Road will operate at unacceptable LOS, as a stop controlled intersection (priority on Southern Klipriversberg Road).

The intersection will operate at acceptable LOS, provided the intersection is signalised, and the layout shown in **Figure 10** is constructed.

# 14. PUBLIC TRANSPORT REQUIREMENTS

## 14.1 INTRODUCTION

In terms of the National Land Transport Transition Act, Act 5 of 2009 (Section 38), it is also necessary to carry out a public transport assessment for all new developments. The assessment need to address aspects such as the additional transport trips that will be generated, the expected traveling pattern of these users, as well as the impact it may have on the existing public transport network.

## 14.2 EXISTING PUBLIC TRANSPORT INFRASTRUCTURE

It has been acknowledged that the City of Johannesburg's 2003-2008 Integrated Transport Plan (ITP) recommends that a Strategic Public Transport Network (SPTN) be implemented. The ITP proposed that a subsidized bus route be confined to the SPTN with minibus taxi serving as feeders to the SPTN. The nearest SPTN route is located along Southern Klipriversberg Road.

In addition to this, taxis and buses were also observed operating along Southern Klipriversberg Road, South Rand Road, East Road, Plinlimmon Road and Nephin Road.

Limited taxi/bus stops are provided along these routes and the buses and taxis stop within the road way.

## 14.3 ESTIMATED NUMBER OF PUBLIC TRANSPORT USERS

A substantial portion of the development is earmarked for residents dependent on public transport for their daily commuting. It can be expected that given the extent of the development, the local taxi industry will have to increase their services to the area, to meet the expected demand.

## 14.4 PROPOSED PUBLIC TRANSPORT INFRASTRUCTURE

As indicated, the applicant sites are earmarked for residents with low vehicle ownership. Thus, as part of the approval of this application sufficient public transport infrastructure is required to meet the expected demand. The details are shown in **Mariteng Plan 172-19-01 to 172-19-05** and include the following:

1.5m paved sidewalks along certain roads.

Taxi stops along East Road, Southern Klipriversberg Road, Nephin Road and South Rand Road.

Taxi stops at the primary and secondary schools.

Taxi stops along certain main internal township roads.

# 15. MOTIVATION FOR RELAXATION OF PARKING REQUIREMENTS

The proposed development is earmarked for a mixed land use, which includes a "Res 3" multi storey dwelling component. These units are typically small with average size of 40m$^2$. The development targets the lower income or entry level housing population of the housing market. A smaller portion of the tenants/owners will have their own vehicle when compared to the middle income group. In terms of the **Gauteng Household Travel Survey** it is confirmed that the vehicle ownership for the study area is only 0.3 cars per household. The demand for parking will thus be substantially lower compare to that of a similar middle to upper market residential development.

In addition to the above, surveys were also carried out at two similar housing developments, located within

the CBD of Johannesburg. These two multi storey residential developments are Brickfield (349 units with 137 parking bays – 0.39 bays/unit) and Legae (192 units with 68 parking bays – 0.35 bays/unit). The developments are located in Newton, with access from Gwigwi Mrwebi Street, between Ntemi Piliso Street and Miriam Makeba Street.

Based on information obtain from the discussions held with the caretaker it is clear that the demand for parking is slightly higher compare to that provided. The caretaker indicated that approximately 17 residents are on the waiting list for parking at Brickfield and only 3 at Legae. Based on this the actual demand for parking at Brickfield is 154 bays or 0.44 bays/unit, and 71 bays or 0.37 bays/unit.

In light of the above, and as part of this application, the local authority is requested to support a parking ratio of 0.5 bays/unit for the "Res 3" multi storey dwelling units.

## 16. OTHER TECHNICAL RELATED MATTERS

### 16.1 ACCOMMODATION OF BUS ROUTES

Buses currently operate along the main external roads abutting the proposed development. The township is therefore accessible to the service and within walking distances less than 1.0km, as prescribed by the Act for public transport users in an urbanized environment.

In terms of the above, no provision is made for the following:

Bus routes along the main internal roads; and

To provide sufficient road reserve width on certain main internal roads to allow for future bus routes.

The above recommendations are made in light of the following technical points:

The taxi industry will provide the necessary public transport service inside the townships.

Subsidized bus route will be confined to the SPTN (Southern Klipriversberg Road), with minibus taxi serving as feeders to the SPTN.

It should be noted that the development is earmarked for residents with low vehicle ownership. Thus should the need in future exist, to extend the bus service in to the study area, it could be done without negatively impacting on the traffic flow along the main internal roads. A future bus route for the South Hills Extension 2 area, if required, should be limited to Leadwood Street, Yellowwood Crescent and Camel Thorn Road.

Given the layout for Erf 1202 South Hills and with an average township depth less than 500m, it is expected that bus service will be limited to Nephin Road. This should not deprive the resident to make a choice from using either a bus or taxi for their daily commuting.

## 16.2 FUTURE BRT ROUTES

Southern Klipriversberg Road is also earmarked to form part of the proposed Bus Rapid Transit (BRT) system. The road reserves with along this section of Southern Klipriversberg Road various between 20.0m and 25.0m. To make provision for the future BRT system along Southern Klipriversberg Road, the following road reserve widths are recommended:

Between intersections a 30.0m road reserve is recommended. In order to achieve the future road reserve width, properties along Southern Klipriversberg Road will have to provide the additional land. The additional land required for this applicant site is indicated in **Figures 11**.

As part of this application provision is also made for potential BRT stations along Southern Klipriversberg Road. Two positions were identified along the road namely, at the Boabab Road and Leadwood Road/Vickers Road intersections. At these two positions, a minimum road reserve width of 38.0m is recommended. Vacant land is available at these two positions, and the impact on the area is shown in **Figures 11.**

It should be noted that the proposed layouts and positions of the BRT Stations are only for planning purposes and to identify the road reserve requirements along Southern Klipriversberg Road. The proposed BRT design parameters should be presented to the relevant authorities to get the necessary approval in terms of their future planning. The implementation of the stations or the BRT system along Southern Klipriversberg Road is not for the account of this development.

## 16.3 PEDESTRIAN FACILITIES

As part of this study, the following additional pedestrian safety measures should be implemented:

Provide raised pedestrian crossings along Nephin Road, at Wax Flower Road/Steelpoort Road intersection.

The existing three speed humps along Nephin Road to be redesigned as raised pedestrian crossings. These pedestrian crossings should be designed and relocated in such a manner, to serve the new residential development.

The existing speed bumps along East Road to be redesigned as platform humps. These platform humps should be designed in such a manner to function as raised pedestrian crossings, serving the existing schools, as well as the new development.

Pedestrian crossing and off loading facilities at the primary and secondary schools – refer to **Figure 12**. Based on the design proposal, an additional 2.0m road reserve widening is required on either side of Milkwood Road, at the secondary school.

Any other position identified during the detail design phase of the development.

## 17. CORRESPONDENCE RECEIVED FROM SANRAL

The South African National Roads Agency commented on the application submitted for Erf 1202 South Hills and South Hills Extension 2. The comments are included in **Annexure G**.

The impact the additional traffic generated by the proposed development on the level-of-service of the N12/R59 Sybrand van Niekerk interchange was also evaluated. Based on the extent of the right applied for, the location of the development in relation the interchange and the employment opportunities in the areas located beyond the interchange was taken into consideration during the evaluation.

In terms of the findings of the traffic report, approximately 5% of the generated traffic will use the road network serving the interchange. This equates to 90 trips (inbound and outbound), during the weekday morning peak hour and 72 trips (inbound and outbound) during the weekday afternoon peak hour. The impact of the development traffic on the capacity of the interchange is therefore negligible and no further assessment of the N12/R59 Sybrand van Niekerk interchange was considered necessary.

## 18. CONCLUSIONS AND RECOMMENDATIONS

### 18.1 CONCLUSIONS

The study addresses the impact of the new development on Erf 1202 South Hills and South Hills Extension 2, on the surrounding road network. The following conclusion can be reached from the study:

i. The applicant site is earmarked for “Res 1”, Res 3” Educational, Institutional, etc.

ii. At present no latent land use rights were identified in the study area that could impact on the findings of this report.

iii. The intersections listed in **Section 4.4**, forms part of the study area.

iv. **Gauteng Infrastructure Act:** The applicant site is not affected by any existing or future provincial roads.

v. The proposed development will generated 2 201 (AM Peak), 376 (Midday Peak – School Traffic), 1 672 (PM Peak) and 407 (SAT Peak) peak hour trips. Given the expected peak hour demand on the external road network, it was considered reasonable to assess the worst case scenarios which is the weekday morning and weekday afternoon peak hours.

vi. **Proposed road network upgrade – background traffic demand**: Substantial road network improvement is required to accommodate the background traffic demand. Schematic layout of the road upgrades are appended in **Annexure C**.

vii. **Proposed road network upgrade – development traffic**: Based on the analysis, additional road upgrade is required to accommodate the trips generated by the proposed development. The contribution towards the external road upgrades is discussed in **Section 17.2**.

viii. **Access Arrangements:** Access to the study area will be provided from Southern Klipriversberg Road, Nephin Road, South Rand Road and East Road (refer to township layout appended in **Annexure A**).

ix. **Public Transport Assessments:** The area is well served by frequent public transport throughout the day. However, given the extent of the development and the demographics of the potential residents, substantial upgrades will be required.

x. Southern Klipriversberg Road is in terms of the R.S.D.F. earmarked for a future BRT route.

## 18.2 RECOMMENDATIONS

Based on the traffic impact study, it is recommended that the new development on Erf 1202 South Hills and South Hills Extension 2, be approved for:

**ERF 1202 SOUTH HILLS (Refer to Annexure A and B)**

| | |
|---|---|
| Residential 1 & 3 | : 2 565 dwelling units (Res 1 = 550 erven and Res 3 = 22 erven) – refer to |
| Primary School | : 1 Erf, for a school with a potential capacity 750 pupils. |
| Church | : 2 Erven |
| Crèche | : 1 Erf |
| Municipality | : 1 Erf - existing swimming pool |
| Public Open Space | : 20 Erven |

**PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2 (Refer to Annexure A and B)**

| | |
|---|---|
| Residential 1 & 3 | : 2 596 dwelling units (Res 1 = 1059 erven and Res 3 = 66 erven) |
| Business 1 | : 1 Erf for a shopping centre with a GLA of 4 000m². |
| Secondary School | : 1 Erf, for a school with a capacity 1 600 pupils. |
| Church | : 2 Erven |
| Crèche | : 2 Erven |
| Community facility | : 1 Erf |

Municipality : 1 Erf – Pickitup

Public Open Space : 30 Erven

The approval is subject to the following:

i. The construction of the following external road upgrades:

**South Rand Road & Plinlimmon Road/Johan Meyer Street**

Provide an exclusive right-turn lane (storage capacity = 60m) on the northbound approach of Johan Meyers Street.

Provide an exclusive right-turn lane (storage capacity = 60m) on the eastbound approach of South Rand Road.

Provide a shared through and slip lane on the southbound approach of Plinlimmon Road.

Provide an exclusive right-turn lane (storage capacity = 60m) on the westbound approach of South Rand Road.

Optimise the traffic signal settings.

**South Rand Road & Risana Avenue/Nephin Street**

Provide an exclusive slip lane (storage capacity = 60m) on the northbound approach of Risana Avenue.

Provide an exclusive right-turn lane (storage capacity = 60m) on the eastbound approach of South Rand Road.

Provide a slip on the westbound approach of South Rand Road.

Install a traffic signal.

**South Rand Road & Risana Avenue**

Provide an exclusive slip lane (storage capacity = 60m) on the southbound approach Risana Avenue.

**South Rand Road & R59 (Sybrand van Niekerk Freeway)**

Optimise traffic signal settings.

**Southern Klipriversberg Road & North Road/Nephin Road**

Provide an exclusive left-turn lane (storage capacity = 60m) on the northbound approach of Nephin Road.

Increase the storage length of the existing right-turn lane on the eastbound and westbound approaches of Southern Klipriversberg Road to 60m.

Optimise the traffic signal settings.

**Vickers Road & North Street**

Provide an exclusive slip lane (storage capacity = 60m) on the eastbound approach of North Street.

Provide an exclusive right-turn lane (storage capacity = 60m) on the eastbound approach of North Street.

Provide a 2nd right-turn lane (storage capacity = 75m) on the southbound approach of Vickers Road. To accommodate the additional right-turn lane, provide a lane (storage capacity = 60m) downstream of the eastbound approach of the intersection.

Increase the storage length of the existing left-turn lane on the southbound approach of Vickers Road to 100m.

Provide a 2nd right-turn lane on the (storage capacity = 120m) on the westbound approach of North Street.

Optimise the traffic signal settings.

ii. The development to contribution towards the construction cost of the intersections listed below. The development should contribute 30% and the local authority the remaining 70%.

**Southern Klipriversberg Road & East Road**

Align the northern and southern approaches of East Road.

Provide an exclusive right-turn lane (storage capacity = 60m) on the northbound approach of East Road.

Provide an exclusive right-turn lane (storage capacity = 60m) on the eastbound approach of Southern Klipriversberg Road.

Provide a 2nd through lane (storage capacity = 60m) on the eastbound approach of Southern Klipriversberg Road. To accommodate the additional through lane, the lane should be extended

for 120m downstream of the intersection.

The southbound approach of East Road should be redesign to allow for an exclusive right-turn lane (storage capacity = 60m), a through lane and an exclusive slip lane (storage capacity = 60m).

Provide an exclusive right-turn lane (storage capacity = 60m) on the westbound approach of Southern Klipriversberg Road.

Provide a 2nd through lane (storage capacity = 90m) on the westbound approach of Southern Klipriversberg Road. To accommodate the additional through lane, the lane should be extended for 120m downstream of the intersection.

Provide an exclusive slip lane on the (storage capacity = 60m) on the westbound approach of Southern Klipriversberg Road.

Install a traffic signal.

**Plinlimmon Road & East Road**

Convert the four legged intersection to a partial intersection.

iii. The external road upgrades listed in Point I and II above, should be undertaken, in lieu of the payment of any the bulk service contributions levied for roads and stormwater. The JRA's support for the off-set of the contributions is requested.

iv. The construction of the following access points:

**South Rand Road & Aida Street/Camel Thorn Street – refer to Annexure C**

Provide an exclusive right-turn lane (storage capacity = 60m) on the eastbound approach of South Rand Road.

Provide an exclusive right-turn lane (storage capacity = 60m) on the southbound approach of Camel Thorn Street.

Provide a shared through and left-turn lane on the southbound approach of Camel Thorn Street.

Provide an exclusive right-turn lane (storage capacity = 60m) on the westbound approach of South Rand Road.

Install a traffic signal.

**Southern Klipriversberg Road & Vickers Road/Leadwood Road – refer to Annexure C**

Provide an exclusive right-turn lane (storage capacity = 60) on the northbound approach of Leadwood Road.

Provide a shared left-turn lane and through lane on the northbound approach of Leadwood Road.

Convert the exclusive left-turn lane on the westbound approach of Southern Klipriversberg Road to a continuous slip.

Provide a 2nd right-turn lane (storage capacity = 60m) on the southbound approach of Vickers Road.

Convert the exclusive left-turn lane on the southbound approach of Vickers Road to a shared left slip and right-turn lane.

To accommodate the additional right-turn lane, provide a lane (storage capacity = 60m) downstream of the westbound approach of the intersection.

Optimise the traffic signal settings.

**Southern Klipriversberg Road & Boabab Road – refer to Figure 10**

Provide an exclusive right-turn lane (storage capacity = 60m) on the eastbound approach of Southern Klipriversberg Road.

Provide a 2nd through lane (storage capacity = 60m) on the eastbound and westbound approaches of Southern Klipriversberg Road. To accommodate the additional through lane, the lane should be extended for 120m downstream of the intersection.

Provide a single exist and entrance lane on Boabab Road.

Install a traffic signal.

v. The construction of the following access points and internal intersections:

Nephin Road and Wax Flower Road/Steelpoort Road – refer to **Figure 10**.

East Road and Milkwood Road – refer to **Figure 10**.

Camel Thorn Road and Milkwood Road – refer to **Figure 10**.

The remaining access points and internal roads/intersections - one lane per direction.

vi. The implementation of the access control measures along the internal road network, as shown in

**Mariteng Plan No. 175-19-01 to 175-19-05**.

vii. The implementation of 1.5m pedestrian walkways along the internal road network, as shown in **Mariteng Plan No. 175-19-01 to 175-19-05**.

viii. The implementation of the necessary pedestrian control measures at the primary and secondary schools, as shown in **Figure 12**. This includes an additional 2.0m road reserve widening on either side of Milkwood Road, at the secondary school.

ix. Providing additional road reserve widening to accommodate the future BRT system and the potential BRT Stations. A minimum width of 30.0m is recommended along Southern Klipriversberg Road, and 38.0m (refer to **Figure 11**) where possible BRT stations may be required. It should be noted that the proposed layouts and positions of the BRT Stations are only for planning purposes and to identify the road reserve requirements along Southern Klipriversberg Road. The proposed BRT design parameters should be presented to the relevant authorities to get the necessary approval in terms of their future planning. The implementation of the stations or the BRT system along Southern Klipriversberg Road is not for the account of this development.

# FIGURES

# ANNEXURE A:

# TOWNSHIP APPLICATION DETAILS
# &
# DEVELOPMENT LAYOUT

# ERF 1202 SOUTH HILLS

Memorandum in support of the application for the removal of restrictive title conditions in terms of Section 5 (5) of the Gauteng Removal of Restrictive Conditions Act of 1996 and the simultaneous rezoning in terms of Section 56(1) of the Town Planning and Townships Ordinance, 1986

November 2011

CTE CONSULTING
TOWN AND REGIONAL PLANNERS

## 1. AIM OF THE APPLICATION

The aim of the application is to remove restrictive title conditions A(1) to A(6) from title deed T6082/1997 in terms of Section 5(5) of the Gauteng Removal of Restrictive Conditions Act of 1996 and simultaneous rezone Erf 1202 South Hills in terms of Section 56(1) of the Town Planning and Townships Ordinance, 1986 (Ordinance 15 of 1986), subject to the subdivision of Erf 1202 South Hills, from Public Open Space to Residential 1, Residential 3, Educational, Institutional, Public Open Space and Public Roads.

**This application needs to be read with the township establishment application for South Hills Extension 2.**

## 2. GENERAL INFORMATION

### *2.1 Property description*

The property is currently known as Erf 1202 South Hills. The property is currently part of the public park also known as Moffat Park.

### *2.2 Location*

Erf 1202 South Hills is situated on South Rand Road (M38) to the south east of the CBD of the City of Johannesburg. Southern Klipriversberg Road is abutting the property to the north and Nephin Road abuts the property on the eastern boundary.

Vickers Road (M19) forms an intersection with Southern Klipriversberg Road to the north of the proposed township.

The Development is situated in close proximity of the N12 Highway to the south and the N17 Highway to the north. The Reading Interchange to the south east of the property is located in close proximity and is accessible through South Rand Road.

### *2.3 Property size*

According to Deed of Transfer T 6082/1997 the property is 37.6546 hectares in extent.

### *2.4 Existing land use*

The property is currently predominantly vacant with the presence of a sports facility in the middle of the property. The property is also currently utilised for illegal dumping and some squatters are found on the site.

### *2.5 Existing zoning*

In terms of the Johannesburg Town Planning Scheme, 1979, the property are zoned “Public Open Space”.

## 3. TOWN PLANNING PROPOSALS

### *3.1 Subdivision and zoning*

The rezoning subject to the subdivision will consist of 597 erven and public roads.

| | | | |
|---|---|---|---|
| Erven 1/1202 to 550/1202 : | Residential 1 | | (550 erven) |
| Erven 551/1202 to 572/1202 | : | Residential 3 | (22 erven) |
| Erf 573/1202 | : | Educational | (1 erf) |

| | | | |
|---|---|---|---|
| Erven 574/1202 to 577/1202 | : | Institutional | (4 erven) |
| Erven 578/1202 to 597/1202 | : | Public Open Space | (20 erven) |
| Street Names | : | Proposed names for new Streets/Roads/Crescents. | |

### *3.2 Access and roads*

The company Mariteng Consulting Engineers performed a detailed traffic study for the proposed development. The findings of the traffic study were incorporated into the proposed layout plan and recommended as follow:

The proposed development will obtain direct access from the following access points along Nephin Road:

- Lily Road opposite Frankfort Street
- Wax Flower Road opposite Steelpoort Street
- Snapdragon Road opposite Messina Street
- Orchard Road opposite Winburn Street
- Buttercup Road opposite Coalbrook Street
- Columbine Road opposite Kinahan Road

### *3.3 City of Johannesburg Tender*

The City of Johannesburg Housing Department set out a tender for the development of the area know as Moffat Park for Inclusionary or Low-Cost Housing. The Tender was awarded to Standard Bank who in turn appointed a turnkey contractor to bring the proposed development to realization.

# SOUTH HILLS EXTENSION 2

Memorandum in support of the application for Township Establishment in terms of section 96(1) of the Town Planning & Townships Ordinance of 1986 (Ordinance 15 of 1986)

November 2011

CTE CONSULTING
TOWN AND REGIONAL PLANNERS

## 4. AIM OF THE APPLICATION

Application is made in terms of Section 96(1) of the Town Planning and Townships Ordinance, 1986 (Ordinance 15 of 1986), to establish a township on Holding 88 Klipriversberg Estate Small Holding A.H. and Portion 65 (a portion of portion 7) of the farm Klipriversberg No. 106 – I.R.

The township will be known as South Hills Ext. 2.

The aim of the application is to establish a township on the mentioned property, to be developed as an Integrated Residential Housing project.

**This application needs to be read with the rezoning application for Erf 1202 South Hills.**

## 5. GENERAL INFORMATION

### *5.1 Property description*

The property is currently known as Holding 88 Klipriversberg Estate Small Holding A.H. and Portion 65 (a portion of portion 7) of the farm Klipriversberg No. 106 – I.R.

The property is also currently known as Moffat Park.

### *5.2 Location*

The proposed township is situated on South Rand Road (M38) to the south east of the CBD of the City of Johannesburg. Southern Klipriversberg Road is abutting the property to the north and East Road abuts the proposed township on the western boundary.

Vickers Road (M19) forms an intersection with Southern Klipriversberg Road to the north of the proposed township.

The Development is situated in close proximity of the N12 Highway to the south and the N17 Highway to the north. The Reading Interchange to the south east of the property is located in close proximity and is accessible through South Rand Road.

### *5.3 Local authority*

The property is located within the municipal area of the City of Johannesburg and within Administrative Region F.

### *5.4 Property size*

According to Deed of Transfer T21254/1939 Holding 88 Klipriversberg Estate Small Holding A.H. is 40.47 hectares in extent.

According to Deed of Transfer T14062/1948 Portion 65 (a portion of portion 7) of the farm Klipriversberg No. 106 – I.R. is 121.5 hectares in extent.

### *5.5 Existing land use*

The property is currently predominantly vacant with the presence of a sports facility on the south-western corner of the property. Pikitup currently has a garden refuse collection site on the property and obtains access from East Road. The property is also currently utilised for illegal dumping and some squatters are found on the site.

### *5.6 Existing zoning*

In terms of the Johannesburg Town Planning Scheme, 1979, the properties are zoned "Public Open Space".

## 6. PROPOSED TOWNSHIP

### *6.1 Erven and zoning*

The township consists of 1166 erven in total and is to be developed in phases.

| | | | |
|---|---|---|---|
| Erven 1 to 1059 | : | Residential 1 | (1059 erven) |
| Erven 1060 to 1125 | : | Residential 3 | (66 erven) |
| Erf 1126 | : | Business 1 | (1 erf) |
| Erf 1127 | : | Educational | (1 erf) |
| Erven 1128 to 1135 | : | Institutional | (8 erven) |
| Erf 1136 | : | Municipal | (1 erf) |
| Erven 1137 to 1166 | : | Public Open Space | (30 erven) |
| Street Names | : | Proposed names for new Streets/Roads/Crescents. | |

### *6.2 Access and roads*

The company Mariteng Consulting Engineers performed a detailed traffic study for the proposed development. The findings of the traffic study were incorporated into the proposed layout plan and recommended as follow:

The proposed development will obtain direct access from the following access points:

- From South Rand Road opposite Aida Street.
- From East Road three new accesses will be created with the intersection of Milkwood Road, Buffalo Thorn road & Weeping Willow Road.
- Two intersections on Southern Klipriversberg Road opposite Vickers Road and South Road.

### *6.3 City of Johannesburg Tender*

The City of Johannesburg Housing Department set out a tender for the development of the area know as Moffat Park for Inclusionary or Low-Cost Housing. The Tender was awarded to Standard Bank who in turn appointed a turnkey contractor to bring the proposed development to realization.

# ANNEXURE B:

# SUMMARY OF RESIDENTIAL UNIT BREAKDOWN

# SOUTH HILLS

| | EASTERN SECTION | | WESTERN SECTION | | TOTAL |
|---|---|---|---|---|---|
| | ERVEN | UNITS | ERVEN | UNITS | |
| RDP/BNG | 41 | 1435 | 9 | 315 | **1750** |
| SOCIAL/GAP | 14 | 588 | 25 | 1242 | **1830** |
| 140m² | 47 | 47 | 130 | 130 | **177** |
| 160m² | 361 | 361 | 128 | 128 | **489** |
| 180m² | 134 | 134 | 636 | 636 | **770** |
| 200m² | 0 | 0 | 97 | 97 | **97** |
| 350m² | 0 | 0 | 48 | 48 | **48** |
| | | | | | |
| TOTAL | | **2565** | | **2596** | **5161** |

# ANNEXURE C:

# SCHEMATIC LAYOUT –
# PROPOSED ROAD NETWORK UPGRADES

# ANNEXURE D:

# TRIP GENERATION CALCULATION DETAILS – PROPOSED DEVELOPMENT

# South Hills Development

## Residential - Eastern Section

### Trip Generation Calculations

| Description | No. of Erven | Dwelling Units | Rate/ Unit | No. of Trips | Trip Reduction | | Final No. of Trips | Directional Split | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Low veh owner | Mixed Use | | AM | | PM | |
| | | | | | | | | IN | OUT | IN | OUT |
| | | | | | No. | No. | | 35% | 65% | 65% | 35% |
| RDP/BNG | 41 | 1435 | 0.5 | 718 | 215 | 108 | 395 | 138 | 257 | 257 | 138 |
| Social/GAP | 14 | 588 | 0.5 | 294 | 88 | 44 | 162 | 57 | 105 | 105 | 57 |
| Erf Size = 140m² | 47 | 47 | 0.5 | 24 | 7 | 4 | 13 | 5 | 8 | 8 | 5 |
| Erf Size = 160m² | 361 | 361 | 0.5 | 181 | 54 | 27 | 99 | 35 | 65 | 65 | 35 |
| Erf Size = 180m² | 134 | 134 | 0.5 | 67 | 20 | 10 | 37 | 13 | 24 | 24 | 13 |
| Erf Size = 200m² | 0 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Erf Size = 350m² | 0 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 597 | 2565 | 0.5 | 1283 | 385 | 192 | 705 | 247 | 458 | 458 | 247 |
| | | | | | | | 1090 | | 705 | | 705 |

### Trip reduction factor applied:

| | |
|---|---|
| Low vehicle ownership | 30% |
| Mixed use | 15% |
| Total reduction factor | 45% |

## Residential - Western Section

### Trip Generation Calculations

| Description | No. of Erven | Dwelling Units | Rate/ Unit | No. of Trips | Trip Reduction | | Final No. of Trips | Directional Split | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Low veh owner | Mixed Use | | AM | | PM | |
| | | | | | | | | IN | OUT | IN | OUT |
| | | | | | No. | No. | | 35% | 65% | 65% | 35% |
| RDP/BNG | 9 | 315 | 0.5 | 158 | 47 | 24 | 87 | 30 | 56 | 56 | 30 |
| Social/GAP | 25 | 1242 | 0.5 | 621 | 186 | 93 | 342 | 120 | 222 | 222 | 120 |
| Erf Size = 140m² | 130 | 130 | 0.5 | 65 | 20 | 10 | 36 | 13 | 23 | 23 | 13 |
| Erf Size = 160m² | 128 | 128 | 0.5 | 64 | 19 | 10 | 35 | 12 | 23 | 23 | 12 |
| Erf Size = 180m² | 636 | 636 | 0.5 | 318 | 95 | 48 | 175 | 61 | 114 | 114 | 61 |
| Erf Size = 200m² | 97 | 97 | 0.5 | 49 | 15 | 7 | 27 | 9 | 17 | 17 | 9 |
| Erf Size = 350m² | 48 | 48 | 0.5 | 24 | 7 | 4 | 13 | 5 | 9 | 9 | 5 |
| TOTAL | 1073 | 2596 | 0.5 | 1298 | 389 | 195 | 714 | 250 | 464 | 464 | 250 |
| | | | | | | | 1103 | | 714 | | 714 |

### Trip reduction factor applied:

| | |
|---|---|
| Low vehicle ownership | 30% |
| Mixed use | 15% |
| Total reduction factor | 45% |

# South Hills Development

## Retail Complex

**Extend of site (m²)**

| Neighbourhood Centre |
|---|
| Access : |

**Floor area ratio (FAR)**

**Extend of dev (m²)** 4000

**Trip generation - South African Trip Generation Rates document**

**Trip generation rates (trips/100m² GLA)**

| | |
|---|---|
| PM Peak | 10.53 |
| Sat Peak | 16.94 |

Used average trip generation factor.

**No of vehicle trips**

| | | Directional Split | |
|---|---|---|---|
| PM Peak | 421 | 50% | 50% |
| SAT Peak | 678 | 50% | 50% |
| | | IN | OUT |

## Trip reduction factor applied:

| | Factor |
|---|---|
| Low vehicle ownership | 30% |
| Mixed use | 10% |
| Total reduction factor | 40% |

| No of Vehicles | |
|---|---|
| PM Peak | 168 |
| Sat Peak | 271 |

## Final No of vehicle trips

| Peak Hour | Total Final Trips | Directional Split | | Number of Vehicles | |
|---|---|---|---|---|---|
| | | IN | OUT | IN | OUT |
| PM Peak | 253 | 50% | 50% | 126 | 126 |
| SAT Peak | 407 | 50% | 50% | 203 | 203 |

# South Hills Development

## Primary School

**Extend of school (pupils)** 750

**Trip generation - South African Trip Generation Rates document**

**Trip generation rates (trips/pupil)**

| | |
|---|---|
| AM Peak | 0.90 |
| Midday Peak | 0.40 |

Peak Hour Factor - Dev 0.50

| **No of vehicle trips** | | Directional Split | |
|---|---|---|---|
| AM Peak | 1350 | 50% | 50% |
| Midday Peak | 600 | 45% | 55% |
| | | IN | OUT |

## Trip reduction factor applied:

| | Factor |
|---|---|
| Low vehicle ownership | 50% |
| Mixed use | 30% |
| Total reduction factor | 80% |

| No of Vehicles | |
|---|---|
| AM Peak | 1080 |
| Midday Peak | 480 |

## Final No of vehicle trips

| Peak Hour | Total Final Trips | Directional Split | | Number of Vehicles | |
|---|---|---|---|---|---|
| | | IN | OUT | IN | OUT |
| AM Peak | 270 | 50% | 50% | 135 | 135 |
| Midday Peak | 120 | 45% | 55% | 54 | 66 |

# South Hills Development

## Secondary School

**Extend of school (pupils)** 1600

**Trip generation - South African Trip Generation Rates document**

**Trip generation rates (trips/pupil)**

| | |
|---|---|
| AM Peak | 0.80 |
| Midday Peak | 0.40 |

Peak Hour Factor - Dev 0.50

| **No of vehicle trips** | | Directional Split | |
|---|---|---|---|
| AM Peak | 2560 | 55% | 45% |
| Midday Peak | 1280 | 45% | 55% |
| | | IN | OUT |

## Trip reduction factor applied:

| | Factor |
|---|---|
| Low vehicle ownership | 50% |
| Mixed use | 30% |
| Total reduction factor | 80% |

| No of Vehicles | |
|---|---|
| AM Peak | 2048 |
| Midday Peak | 1024 |

## Final No of vehicle trips

| Peak Hour | Total Final Trips | Directional Split | | Number of Vehicles | |
|---|---|---|---|---|---|
| | | IN | OUT | IN | OUT |
| AM Peak | 512 | 55% | 45% | 282 | 230 |
| Midday Peak | 256 | 45% | 55% | 115 | 141 |

# ANNEXURE E:

# TRIP DISTRIBUTION AND ASSIGNMENT DETAILS – PROPOSED DEVELOPMENT

# ANNEXURE F:

# CAPACITY ANALYSIS RESULTS
# (DATA AVAILABLE ON REQUEST)

# ANNEXURE G:

# INTERNAL ROAD NETWORK PLANNING – MARITENG PLANS 175-19-01 TO 175-19-05

# ANNEXURE H:

# SANRAL CORRESPONDENCE

THE SOUTH AFRICAN NATIONAL ROADS AGENCY LTD

Reg. No.1998/009584/06

SANRAL is an Agency of the Ministry of Transport

**Northern Region**
38 Ida Street, Menlo Park, Pretoria
Private Bag X17, Lynnwood Ridge, 0040, South Africa
Tel +27 (0) 12 426 6200 Fax +27 (0) 12 348 1680/ 0883/ 1512
**Offices in** Val de Grace – Pretoria (Head Office), Cape Town, Pietermaritzburg, Port Elizabeth

| | | | |
|---|---|---|---|
| Reference: | N11/5/3-12/18-46 | Fax Number: | +27 (0) 12 844 8200 |
| Date: | 24 January 2012 | Direct Line: | +27 (0) 12 844 8105 |
| Contact Person: | Jan Oliver | Website: | www.nra.co.za |
| Email: | oliverj@nra.co.za | | |

CTE Consulting Town and Regional Planning
PO Box 3374
Randburg
2125

For attention: Tinus

Sir

**SIMULTANEOUS REZONING AND REMOVAL OF RESTRICTIONS ACT, 1966**
**IN RESPECT OF**

TOWNSHIP(s): SOUTH HILLS
ERF/ERVEN: 1202
REGNO: 13-12134

The request for comments from the Excecutive Director Development Planning and Urban Management of the City of Johannesburg dated 25 November 2011 and the memorandum in support of the application prepared by CTE Consulting dated November 2011, refer.

The memorandum does not address the impact of the development on traffic operations. The property to be developed is located near the N12 / Sybrand van Niekerk Freeway (R59) Interchange. Traffic generated by the proposed development warrants the preparation of a Traffic Impact Study. The cost of such study will be for the developer. The study must include the impact of the proposed development on traffic operations at the N12 / Sybrand van Niekerk Freeway (R59) Interchange. Only on receipt of the study will the South African National Roads Agency SOC Limited (SANRAL) be in a position to provide comments on the application for rezoning and removal of restrictions.

Yours sincerely

24/1/2012

For REGIONAL MANAGER: NORTHERN REGION
#446802-v2

*Creating wealth through infrastructure*



MARITENG MANAGEMENT SOLUTIONS

P.O. Box 8864
Verwoerd Park
1453

Tel: 011 902 4075
Fax: 086 547 8882
Cell: 082 854 7358


**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

**LOCALITY PLAN**

**FIGURE**

**1**


MARTENG MANAGEMENT SOLUTIONS

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Verwoerd Park
1453

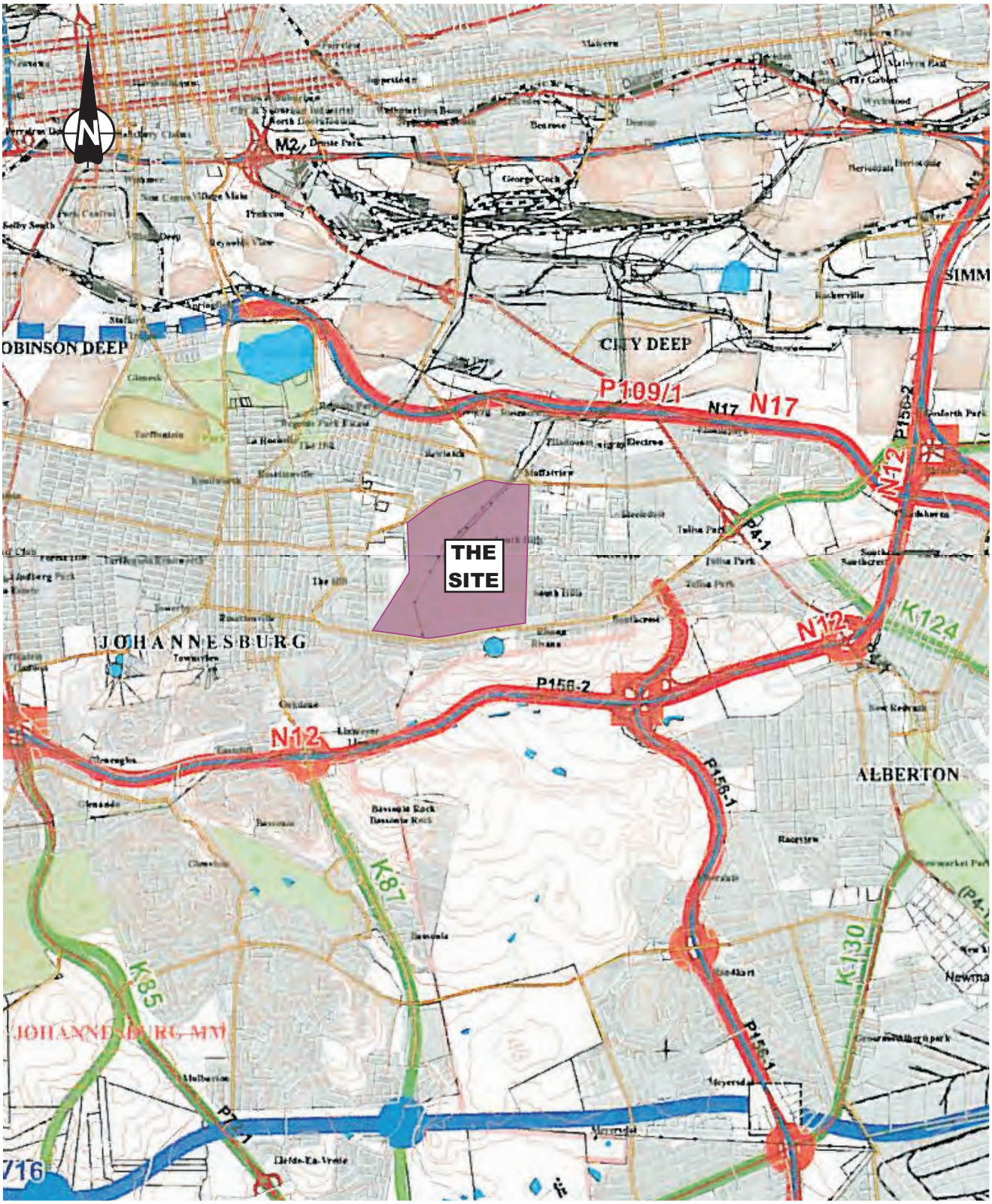
Tel: 011 902 4075
Fax: 086 547 8882
Cell: 082 854 7358

**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

**AERIAL VIEW OF STUDY AREA**

**FIGURE**

**2**




MARTENG MANAGEMENT SOLUTIONS
P.O. Box 8864
Verwoerd Park
1453

Tel: 011 902 4075
Fax: 086 547 8882
Cell: 082 854 7358

**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

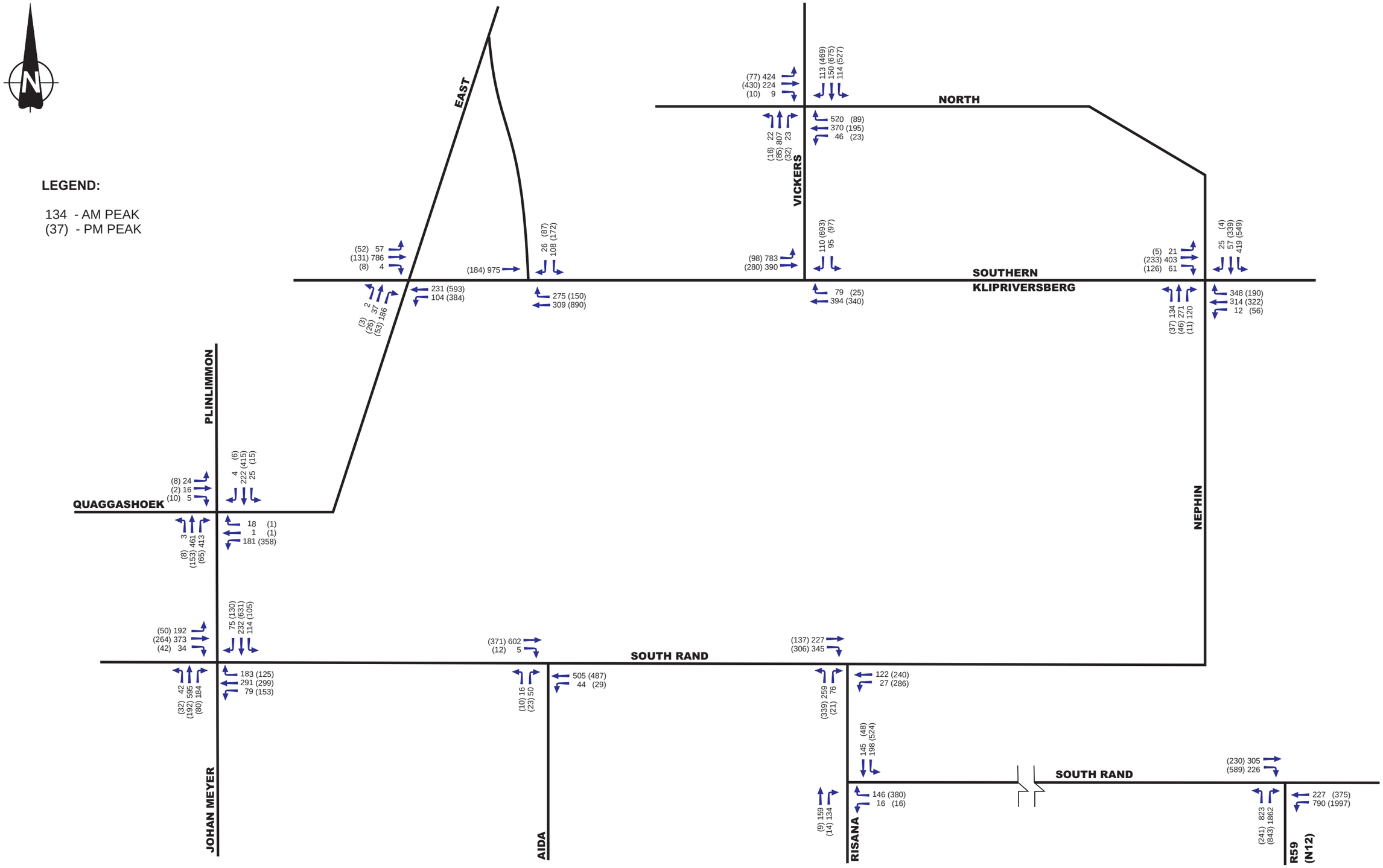
**PWV ROAD NETWORK**

**FIGURE**

**3**

**LEGEND:**

134 - AM PEAK
(37) - PM PEAK





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**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

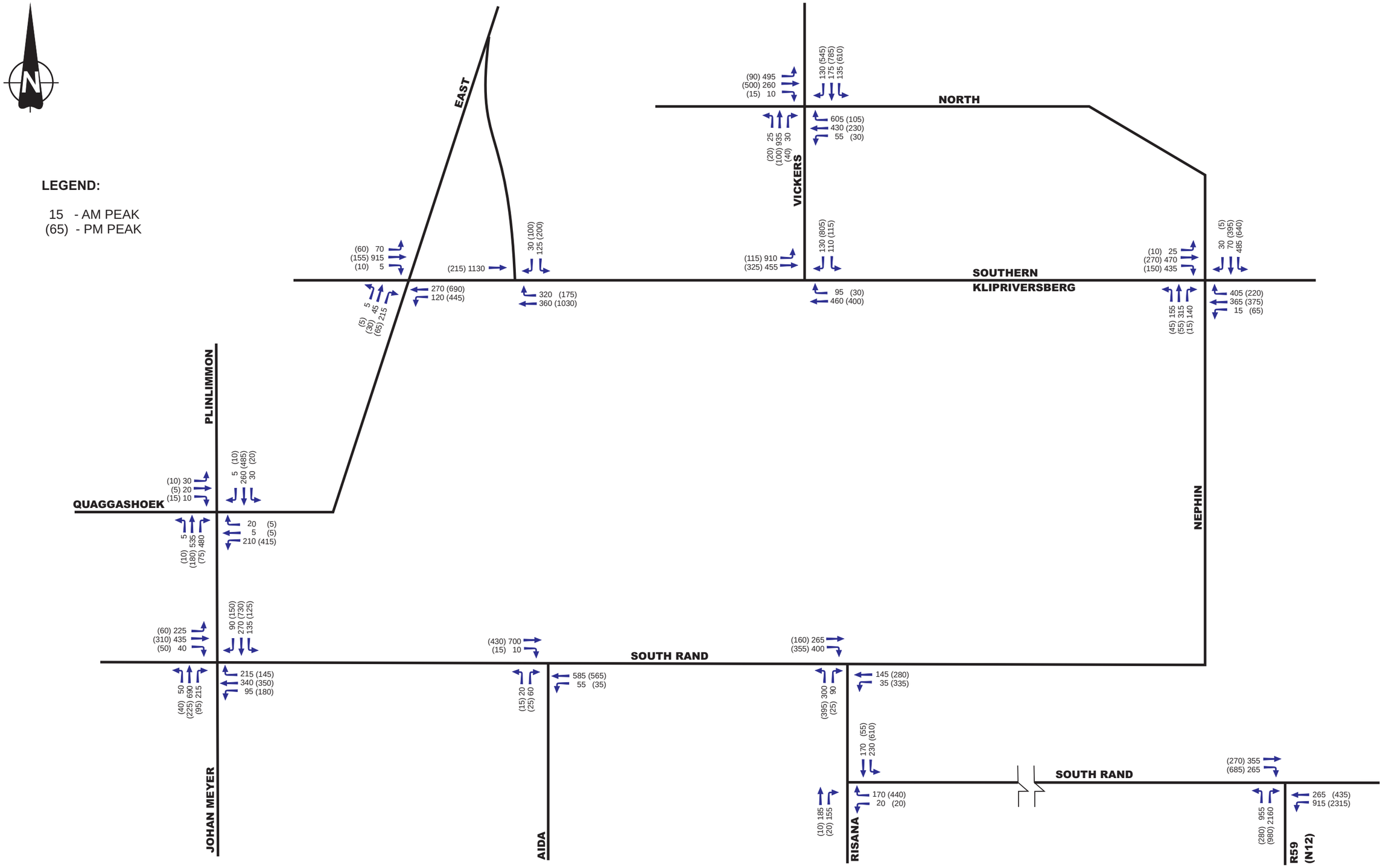
# EXISTING WEEKDAY PEAK HOUR TRAFFIC VOLUMES (BACKGROUND TRAFFIC)

**FIGURE**

**4**

**LEGEND:**

15 - AM PEAK
(65) - PM PEAK





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**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

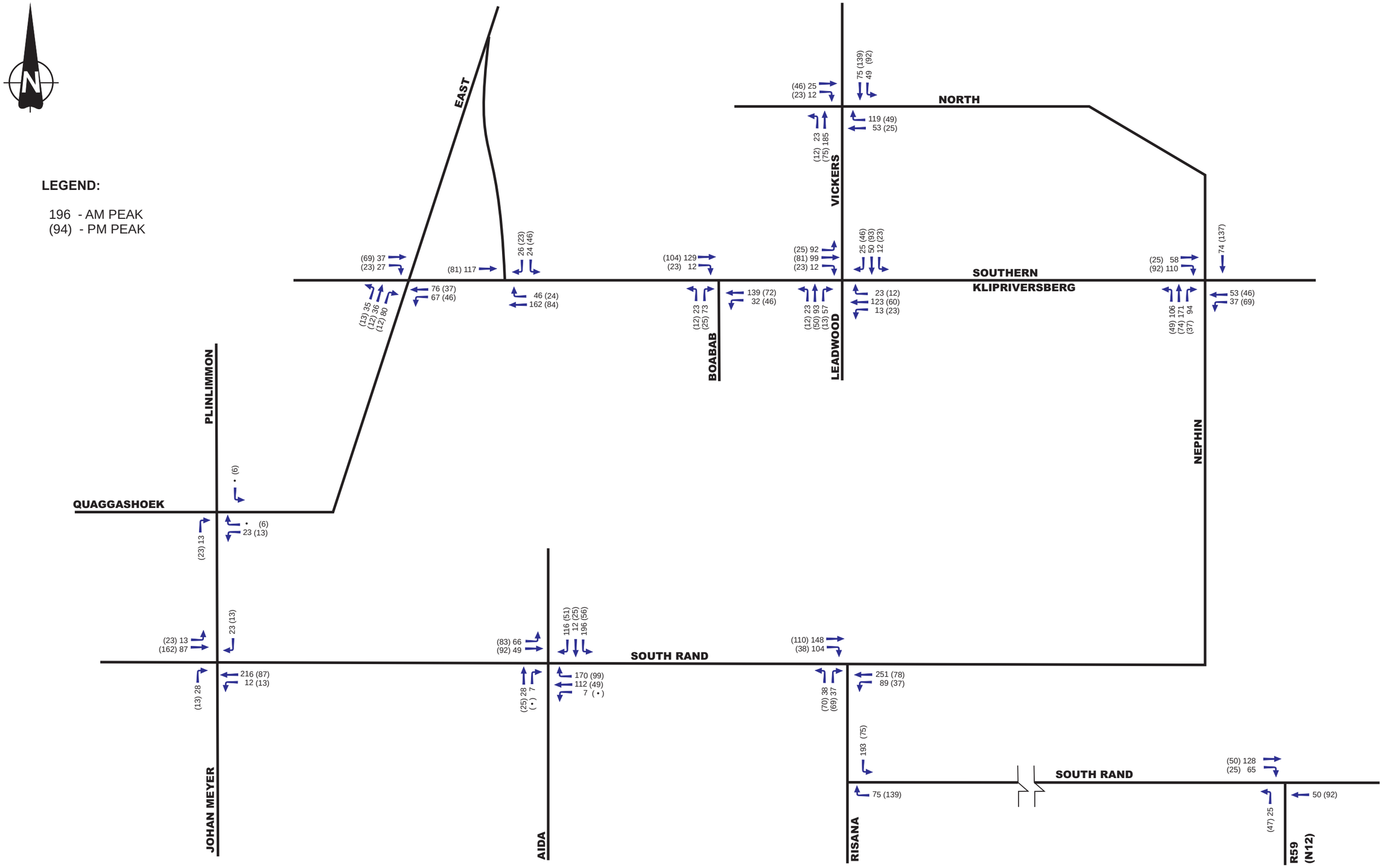
**ESTIMATED (2017) WEEKDAY PEAK HOUR TRAFFIC VOLUMES (BACKGROUND TRAFFIC)**

**FIGURE**

**5**

**LEGEND:**

196 - AM PEAK
(94) - PM PEAK





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**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

**TOTAL TRIP ASSIGNMENT (VEHICLES/HR): PROPOSED DEVELOPMENT**

**FIGURE**

**6**

**LEGEND:**

15 - AM PEAK
(65) - PM PEAK

EAST
NORTH
SOUTHERN KLIPRIVERSBERG
SOUTH RAND
QUAGGASHOEK
PLINLIMMON
JOHAN MEYER
VICKERS
BOABAB
LEADWOOD
CAMEL THORN
AIDA
RISANA
NEPHIN
R59 (N12)

(52) 57
(200) 823
(31) 31
(265) 1092
52 (110)
132 (218)
307 (630)
171 (430)
321 (174)
471 (974)
(16) 37
(38) 73
(65) 266
(482) 1302
(23) 12
643 (1105)
32 (46)
(12) 23
(25) 73
(123) 875
(361) 489
(23) 12
(12) 23
(50) 93
(13) 57
(77) 424
(476) 249
(33) 21
113 (469)
225 (814)
163 (619)
45
992
23
(28)
(160)
(32)
639 (138)
423 (220)
46 (23)
135 (739)
50 (93)
107 (120)
102 (37)
517 (400)
13 (23)
(5) 21
(258) 461
(218) 171
25 (4)
131 (476)
419 (549)
(86) 240
(120) 442
(48) 214
348 (190)
367 (368)
49 (125)
(8) 24
(2) 16
(10) 5
4 (6)
222 (415)
25 (21)
3
(8) 461
(153) 426
(78)
18 (7)
1 (1)
204 (371)
(73) 205
(426) 460
(42) 34
98 (143)
232 (631)
114 (105)
(32) 42
(192) 595
(93) 212
183 (125)
507 (386)
91 (166)
(83) 66
(463) 651
(12) 5
116 (51)
12 (25)
196 (56)
(10) 16
(25) 28
(23) 57
170 (99)
617 (536)
51 (29)
(247) 375
(344) 449
(409) 297
(90) 113
373 (318)
116 (323)
145 (48)
391 (599)
(9) 159
(14) 134
221 (519)
16 (16)
(280) 433
(614) 291
(288) 848
(843) 1862
277 (487)
790 (1997)


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**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

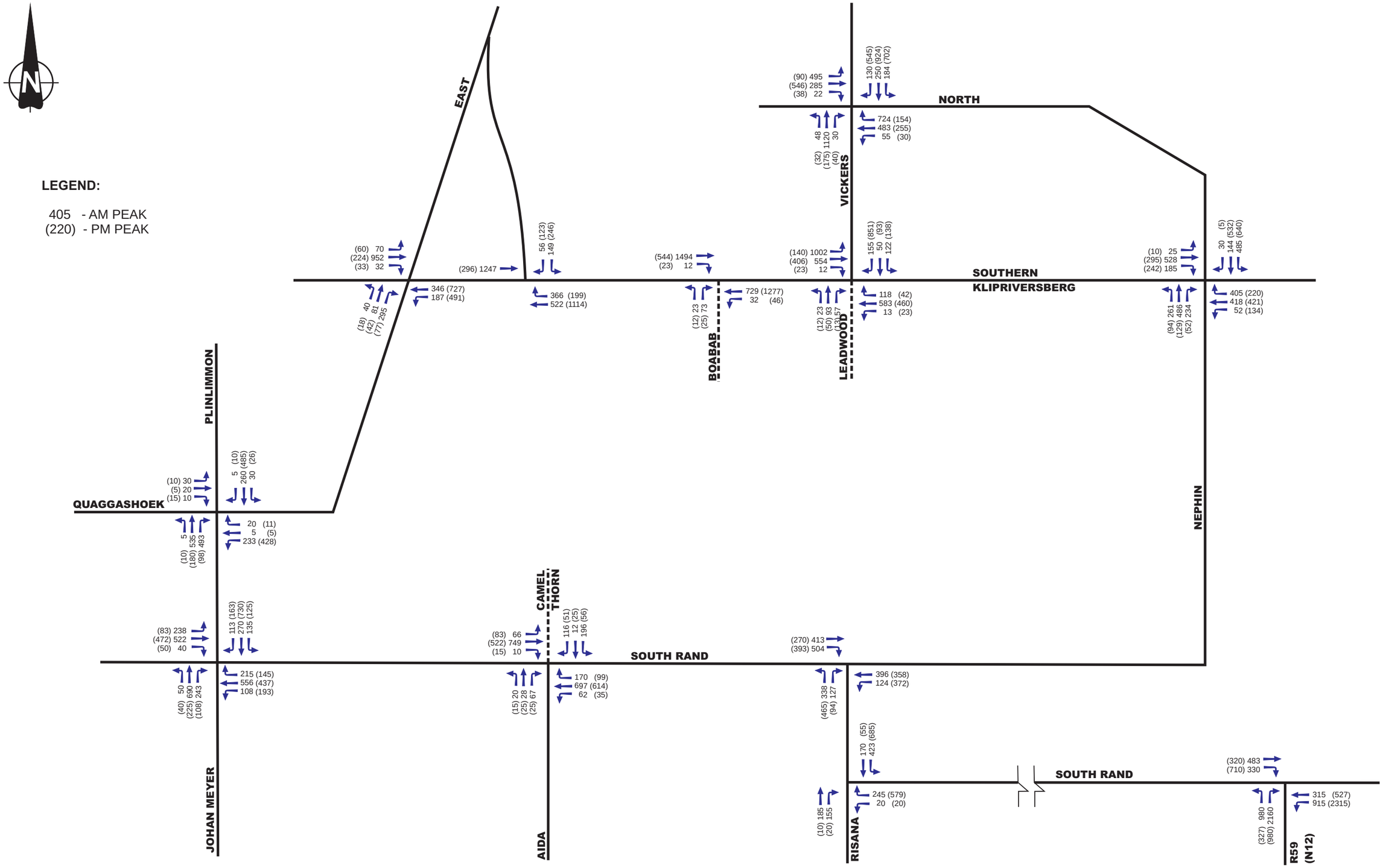
# ESTIMATED (2012) WEEKDAY PEAK HOUR TRAFFIC VOLUMES (WITH DEVELOPMENT)

**FIGURE**

**7**

**LEGEND:**

405 - AM PEAK
(220) - PM PEAK





MARTENG MANAGEMENT SOLUTIONS

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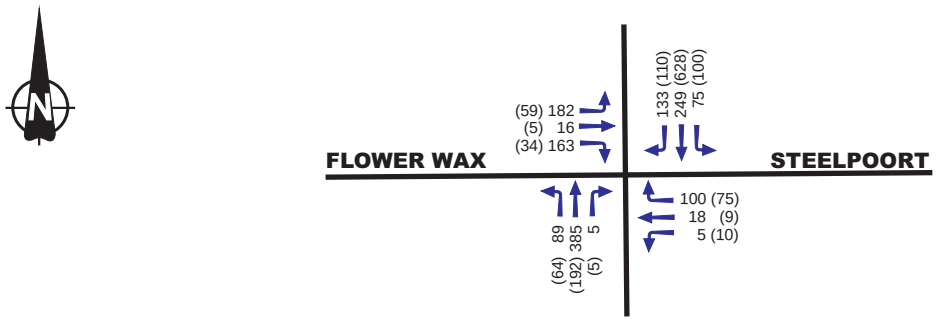
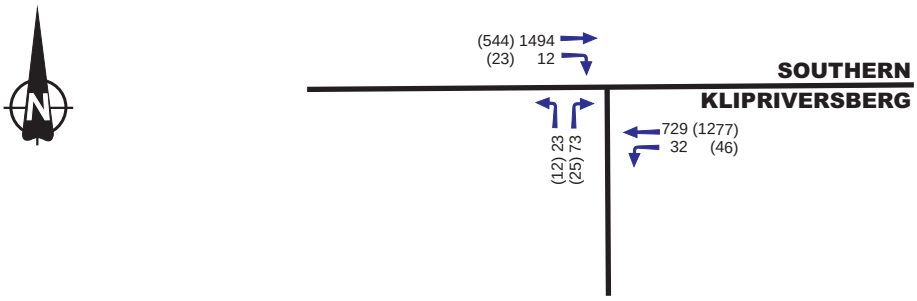
**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

# ESTIMATED (2017) WEEKDAY PEAK HOUR TRAFFIC VOLUMES (WITH DEVELOPMENT)

**FIGURE**

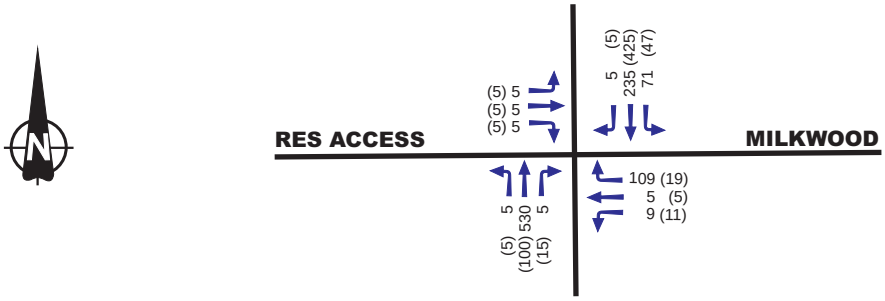
**8**




**LEGEND:**

1494 - AM PEAK
(544) - PM PEAK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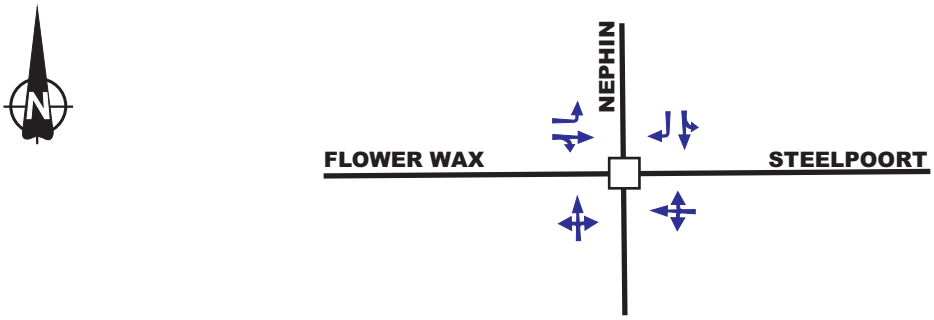
**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

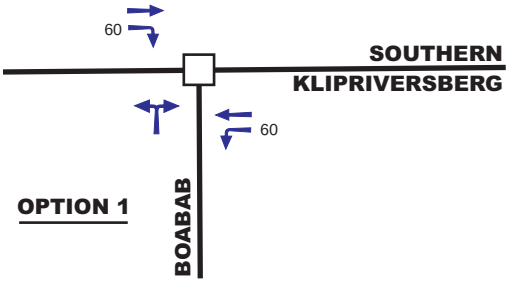
**ESTIMATED (2012) WEEKDAY PEAK HOUR TRAFFIC VOLUMES - INTERNAL ROAD NETWORK**

**FIGURE**

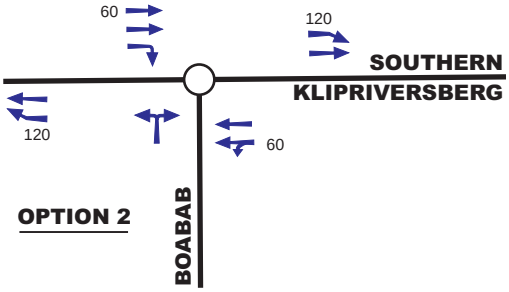
**9**



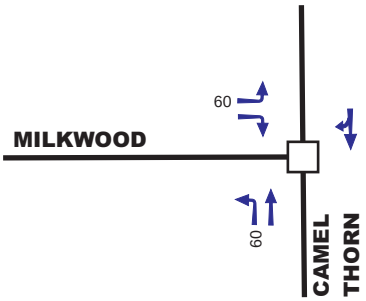

STOP CONTROL WITH FREE FLOW ON NEPHIN



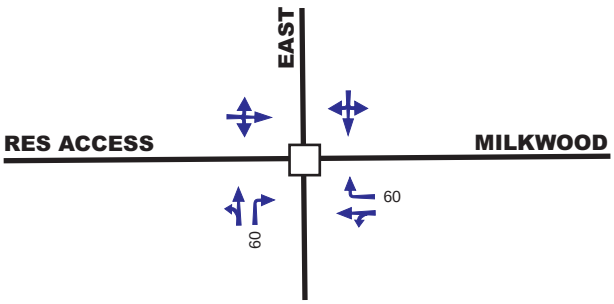

STOP CONTROL WITH FREE FLOW
ON SOUTHERN KLIPRIVERSBERG




INTERSECTION WITH TRAFFIC SIGNAL




STOP CONTROL WITH FREE FLOW ON CAMEL THORN




STOP CONTROL WITH FREE FLOW ON EAST

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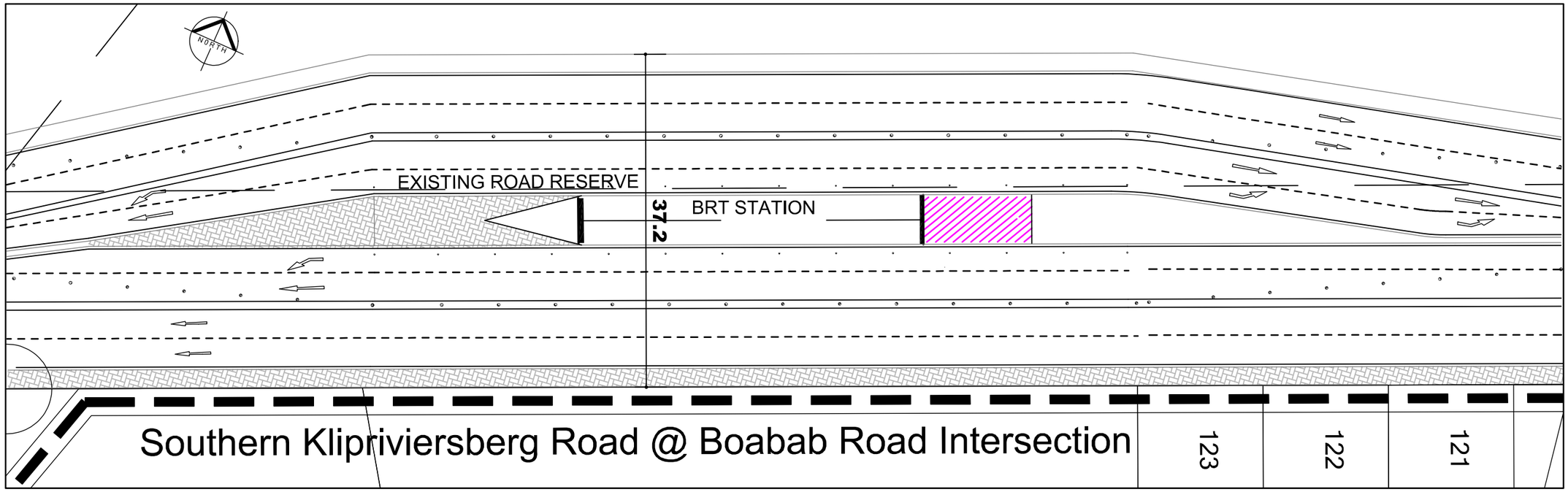
**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

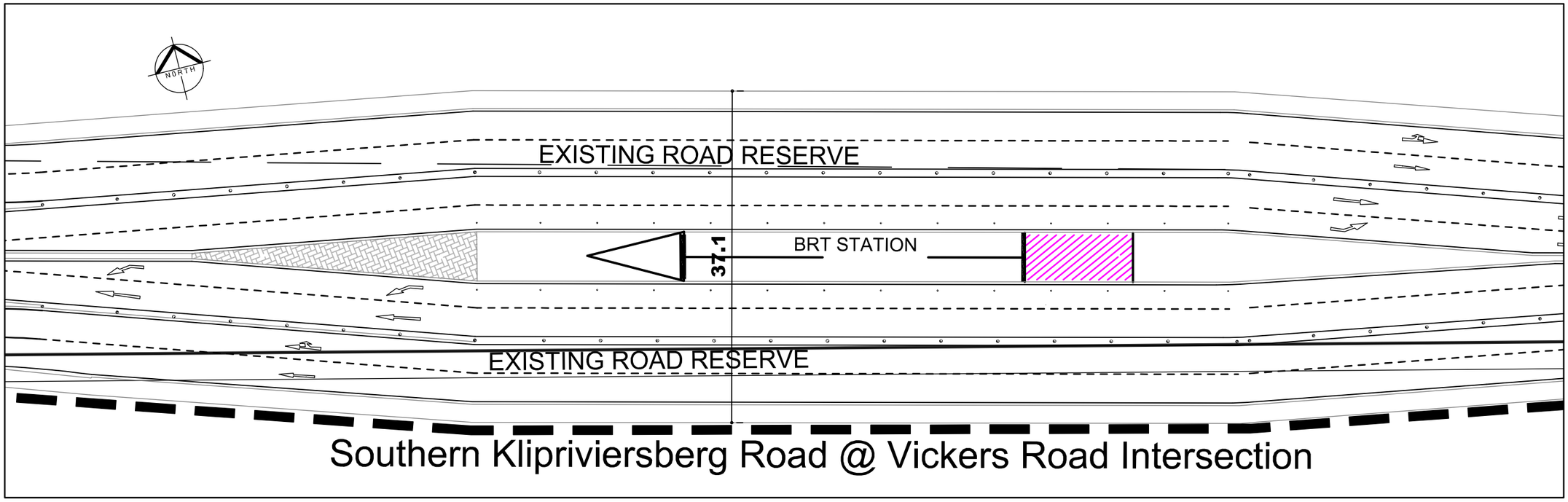
**PROPOSED INTERSECTION LAYOUT - INTERNAL ROAD NETWORK**

FIGURE

10




Southern Klipriviersberg Road @ Boabab Road Intersection




Southern Klipriviersberg Road @ Vickers Road Intersection

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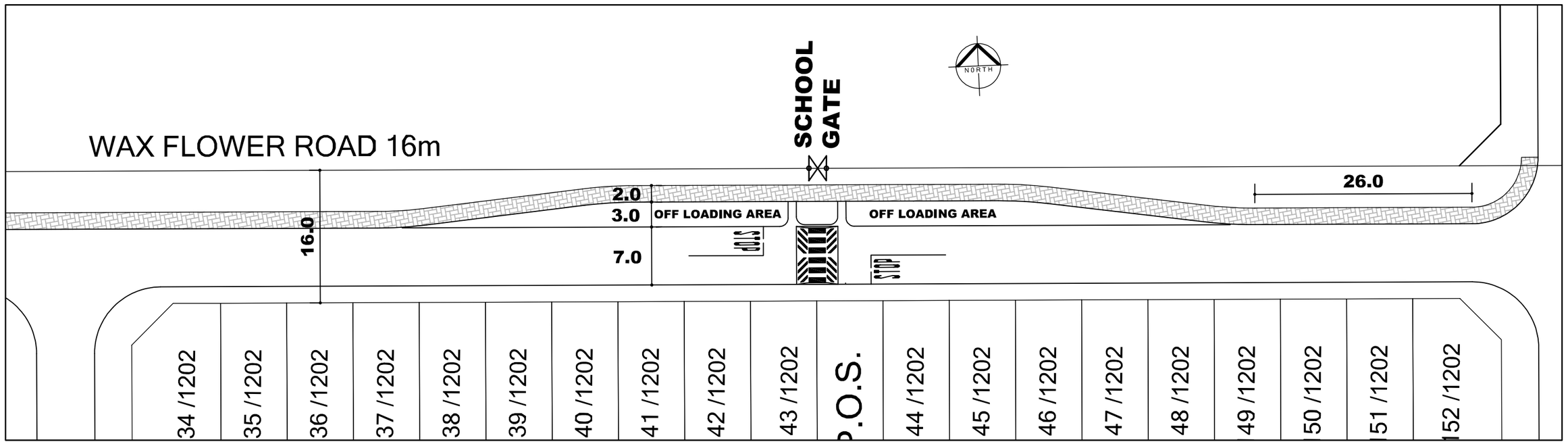
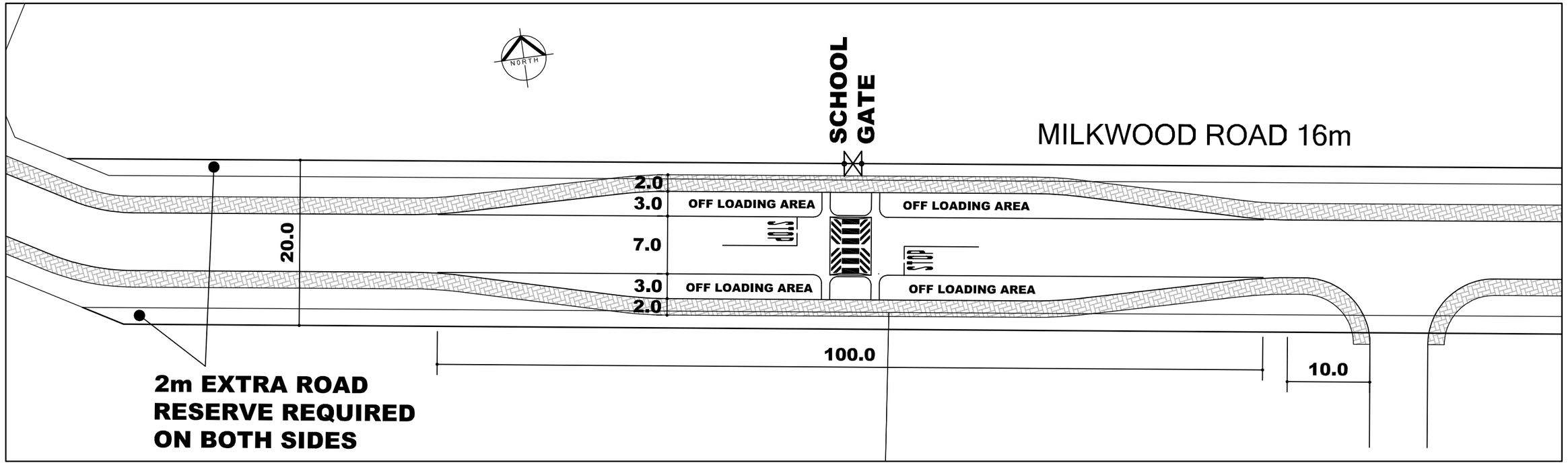
**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

**FUTURE BRT STATION POSITION ALONG SOUTHERN KLIPRIVERSBERG & ROAD RESERVE WIDTH REQUIREMENTS**

**FIGURE**

**11**

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**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

# PEDESTRIAN FACILITIES AT PRIMARY AND SECONDARY SCHOOLS

**FIGURE**

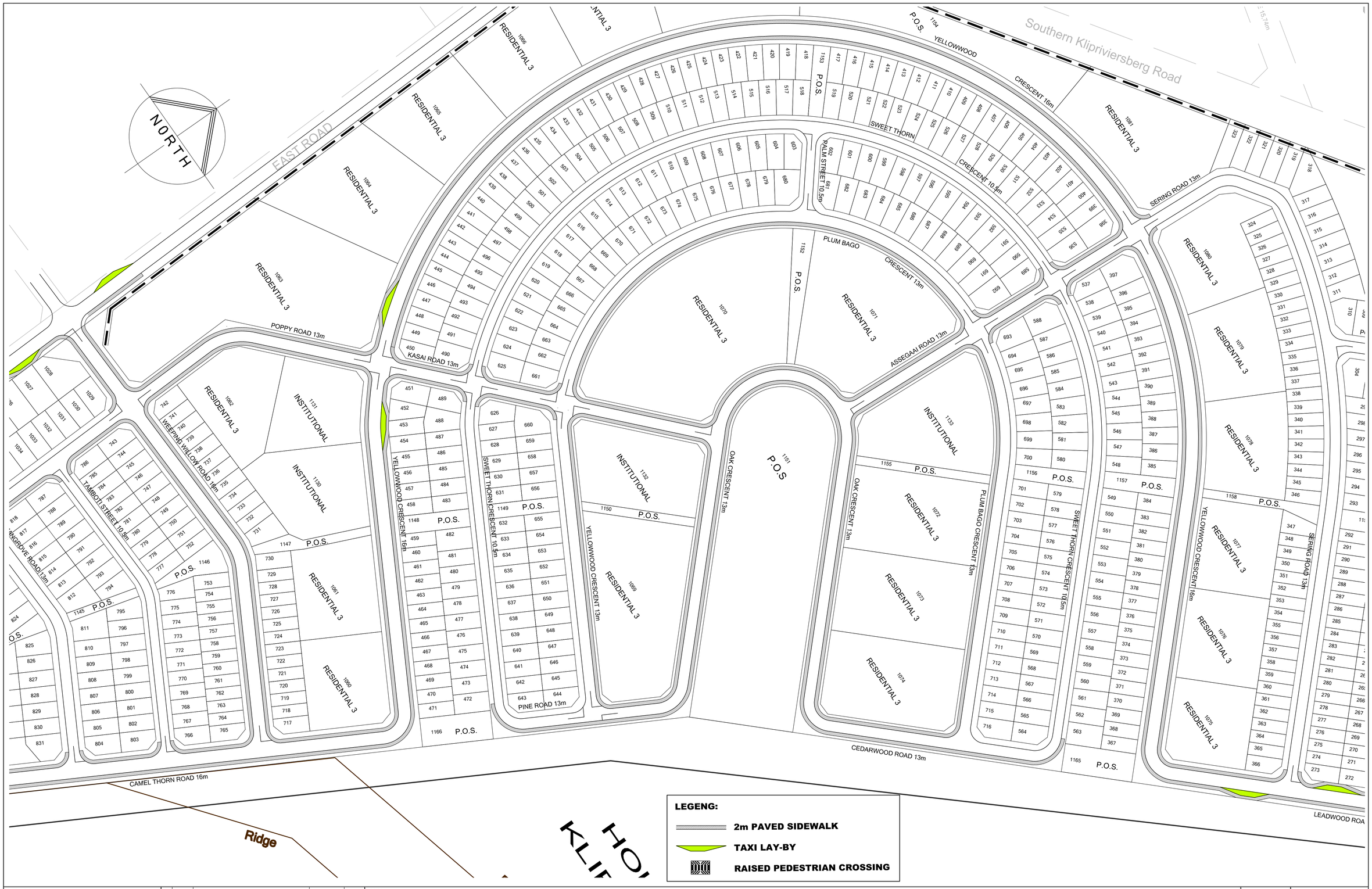
**12**


| | | | | | |
|---|---|---|---|---|---|
| DESIGNED BY: MARTENG MANAGEMENT SOLUTIONS — P.O. Box 8864, Verwoerd Park, 1453; Tel: 011 902 4075; Fax: 086 547 8882; Cell: 082 854 7358 | | | | | PROJECT: ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2 |
| | NR | DATE | AMENDMENTS | ENGINEER | DATE |
| | | | | | PROPOSED PUBLIC TRANSPORT AND PEDESTRIAN FACILITIES |

SKAAL/SCALE: 1:1000

DATE: 07/02/12 REVISION: 0

PLAN NR./PLAN NO.: 175-19-01

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| NR | DATE | AMENDMENTS | ENGINEER | DATE |
|---|---|---|---|---|
| | | | | |

PROJECT:

**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

# PROPOSED PUBLIC TRANSPORT AND PEDESTRIAN FACILITIES

SKAAL/SCALE: **1:1000**

DATE: **07/02/12** REVISION: **0**

PLAN NR./PLAN NO.: **175-19-02**

106-IR

Ridge

50m Buffer on Ridge

Ridge

50m Buffer on Ridge

**LEGENG:**

- 2m PAVED SIDEWALK
- TAXI LAY-BY
- RAISED PEDESTRIAN CROSSING

NORTH

RESIDENTIAL 3 1121

RESIDENTIAL 3 1122

RESIDENTIAL 3 1123

RESIDENTIAL 3 1124

RESIDENTIAL 3 1125

WAX FLOWER ROAD 16m

RESIDENTIAL 3 1120

RESIDENTIAL 3 1119

RESIDENTIAL 3 1118

DAFFODIL ROAD 16m

595 /1202 P.O.S.

VIOLET ROAD 16m

RESIDENTIAL 3 1117

RESIDENTIAL 3 1116

RESIDENTIAL 3 1115

590 /1202 P.O.S.

598 /1202 P.O.S.

RESIDENTIAL 3 566 /1202

RESIDENTIAL 3 569 /1202

RESIDENTIAL 3 568 /1202

RESIDENTIAL 3 567 /1202

SUGAR BUSH ROAD 13m

RESIDENTIAL 3 565 /1202

RESIDENTIAL 3 570 /1202

INSTITUTIONAL 574 /1202

DAFFODIL ROAD 16m

RESIDENTIAL 3 564 /1202

RESIDENTIAL 3 571 /1202

RESIDENTIAL 3 572 /1202

TULIP ROAD 16m

RESIDENTIAL 3 563 /1202

LILY ROAD 16m

RESIDENTIAL 3 562 /1202

RESIDENTIAL 3 561 /1202

RESIDENTIAL 3 560 /1202

RESIDENTIAL 3 559 /1202

RESIDENTIAL 3 558 /1202

597 /1202 P.O.S.

NEPHIN ROAD 15,74m

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19 /1202 | 20 /1202 | 57 /1202 | 58 /1202 | 95 /1202 | 96 /1202 | 133 /1202 | 134 /1202 | 205 /1202 | 204 /1202 | 244 /1202 | 245 /1202 | 270 /1202 | 271 /1202 | 183 /1202 | 153 /1202 | 154 /1202 | 155 /1202 | 156 /1202 | 157 /1202 | 158 /1202 | 159 /1202 | 160 /1202 | 161 /1202 | 162 /1202 |
| 18 /1202 | 21 /1202 | 56 /1202 | 59 /1202 | 94 /1202 | 97 /1202 | 132 /1202 | 135 /1202 | | 203 /1202 | 243 /1202 | 246 /1202 | 269 /1202 | 272 /1202 | 182 /1202 | | | | | | | | | | |
| 17 /1202 | 22 /1202 | 55 /1202 | 60 /1202 | 93 /1202 | 98 /1202 | 131 /1202 | 136 /1202 | 206 /1202 | 202 /1202 | 242 /1202 | 247 /1202 | 268 /1202 | 273 /1202 | 181 /1202 | | | | | | | | | | |
| 16 /1202 | 23 /1202 | 54 /1202 | 61 /1202 | 92 /1202 | 99 /1202 | 130 /1202 | 137 /1202 | 207 /1202 | 201 /1202 | 241 /1202 | 248 /1202 | 267 /1202 | 274 /1202 | 180 /1202 | | | | | | | | | | |
| 15 /1202 | 24 /1202 | 53 /1202 | 62 /1202 | 91 /1202 | 100 /1202 | 129 /1202 | 138 /1202 | 208 /1202 | 200 /1202 | 240 /1202 | 249 /1202 | 266 /1202 | 275 /1202 | 179 /1202 | | | | | | | | | | |
| 14 /1202 | 25 /1202 | 52 /1202 | 63 /1202 | 90 /1202 | 101 /1202 | 128 /1202 | 139 /1202 | 209 /1202 | 199 /1202 | 239 /1202 | 250 /1202 | 265 /1202 | 276 /1202 | 178 /1202 | | | | | | | | | | |
| 13 /1202 | 26 /1202 | 51 /1202 | 64 /1202 | 89 /1202 | 102 /1202 | 127 /1202 | 140 /1202 | 210 /1202 | 198 /1202 | 238 /1202 | 251 /1202 | 264 /1202 | 277 /1202 | 177 /1202 | | | | | | | | | | |
| 12 /1202 | 27 /1202 | 50 /1202 | 65 /1202 | 88 /1202 | 103 /1202 | 126 /1202 | 141 /1202 | 211 /1202 | 197 /1202 | 237 /1202 | 252 /1202 | 263 /1202 | 278 /1202 | 176 /1202 | | | | | | | | | | |
| 11 /1202 | 28 /1202 | 49 /1202 | 66 /1202 | 87 /1202 | 104 /1202 | 125 /1202 | 142 /1202 | 212 /1202 | 196 /1202 | 236 /1202 | 253 /1202 | 262 /1202 | 279 /1202 | 175 /1202 | | | | | | | | | | |
| 10 /1202 | 29 /1202 | 48 /1202 | 67 /1202 | 86 /1202 | 105 /1202 | 124 /1202 | 143 /1202 | 213 /1202 | 195 /1202 | 235 /1202 | 254 /1202 | 261 /1202 | 280 /1202 | 174 /1202 | | | | | | | | | | |
| 594 /1202 P.O.S. | | 593 /1202 P.O.S. | | 592 /1202 P.O.S. | | 591 /1202 P.O.S. | | 214 /1202 | 194 /1202 | 234 /1202 | 255 /1202 | 260 /1202 | 281 /1202 | 173 /1202 | | | | | | | | | | |
| 9 /1202 | 30 /1202 | 47 /1202 | 68 /1202 | 85 /1202 | 106 /1202 | 123 /1202 | 144 /1202 | 215 /1202 | 193 /1202 | 233 /1202 | 256 /1202 | 259 /1202 | 282 /1202 | 172 /1202 | | | | | | | | | | |
| 8 /1202 | 31 /1202 | 46 /1202 | 69 /1202 | 84 /1202 | 107 /1202 | 122 /1202 | 145 /1202 | 216 /1202 | 192 /1202 | 232 /1202 | 257 /1202 | 258 /1202 | 283 /1202 | 171 /1202 | | | | | | | | | | |
| 7 /1202 | 32 /1202 | 45 /1202 | 70 /1202 | 83 /1202 | 108 /1202 | 121 /1202 | 146 /1202 | 217 /1202 | 191 /1202 | | | | | 170 /1202 | | | | | | | | | | |
| 6 /1202 | 33 /1202 | 44 /1202 | 71 /1202 | 82 /1202 | 109 /1202 | 120 /1202 | 147 /1202 | 218 /1202 | 190 /1202 | | | | | 169 /1202 | | | | | | | | | | |
| 5 /1202 | 34 /1202 | 43 /1202 | 72 /1202 | 81 /1202 | 110 /1202 | 119 /1202 | 148 /1202 | 219 /1202 | 189 /1202 | | | | | 168 /1202 | | | | | | | | | | |
| 4 /1202 | 35 /1202 | 42 /1202 | 73 /1202 | 80 /1202 | 111 /1202 | 118 /1202 | 149 /1202 | 220 /1202 | 188 /1202 | | | | | 167 /1202 | | | | | | | | | | |
| 3 /1202 | 36 /1202 | 41 /1202 | 74 /1202 | 79 /1202 | 112 /1202 | 117 /1202 | 150 /1202 | 221 /1202 | 187 /1202 | | | | | | | | | | | | | | | |
| 2 /1202 | 37 /1202 | 40 /1202 | 75 /1202 | 78 /1202 | 113 /1202 | 116 /1202 | 151 /1202 | 222 /1202 | 186 /1202 | | | | | | | | | | | | | | | |
| 1 /1202 | 38 /1202 | 39 /1202 | 76 /1202 | 77 /1202 | 114 /1202 | 115 /1202 | 152 /1202 | 223 /1202 | 185 /1202 | | | | | | | | | | | | | | | |
| | | | | | | | | 224 /1202 | 184 /1202 | | | | | | | | | | | | | | | |
| | | | | | | | | 225 /1202 | | | | | | | | | | | | | | | | |
| | | | | | | | | 226 /1202 | | | | | | | | | | | | | | | | |
| | | | | | | | | 227 /1202 | | | | | | | | | | | | | | | | |
| | | | | | | | | 231 /1202 | 230 /1202 | 229 /1202 | 228 /1202 | | | | | | | | | | | | | |

YOLK STREET 10,5m

SUNFLOWER ROAD 13m

STAR APPLE STREET 10,5m

SCHOOL GATE

EDUCATIONAL 573 /1202

PROPOSED SCHOOL ACCESS

WAX FLOWER ROAD 16m

16.0

7.0

3.0

3.0

GIFT LOADING AREA

26.0

589 /1202 P.O.S.

COSMOS CLOSE 10,5m

SNAPDRAGON ROAD 13m

BLOOM STREET 10,5m

589 /1202 P.O.S.

SPEEDWELL STREET 10,5m

Sextkude 6002/1999

SOUTH RAND ROAD


DESIGNED BY:

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| NR | DATE | AMENDMENTS | ENGINEER | DATE |
|---|---|---|---|---|
| | | | | |

PROJECT:

**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

# PROPOSED PUBLIC TRANSPORT AND PEDESTRIAN FACILITIES

SKAAL/SCALE: 1:1000

DATE: 07/02/12

REVISION: 0

PLAN NR./PLAN NO.: 175-19-03

**LEGENG:**

- 2m PAVED SIDEWALK
- TAXI LAY-BY
- RAISED PEDESTRIAN CROSSING

NORTH

Ridge

DRUMSTICK ROAD 13m

DRUMSTICK ROAD 13m

DRUMSTICK ROAD 13m

CORONATION ROAD 16m

CORONATION ROAD 16m

SNEEZWOOD ROAD 13m

BELL FLOWER ROAD 13m

ORCHRID ROAD 16m

LAVENDER ROAD 13m

BUTTERCUP ROAD 13m

COLUMBINE ROAD 13m

COLUMBINE ROAD 13m

WIND FLOWER ROAD 13m

DAISY STREET 10.5m

ROSE STREET 10.5m

SNOW BERRY STREET 10.5m

GULLY FLOWER STREET 10.5m

AMARYLLIS STREET 10.5m

BOTTLEBRUSH STREET 10.5m

BEE BALM ROAD 13m

CORN FLOWER ROAD 13m

NEPHIN ROAD 15,74m

NEPHIN ROAD 15,74m

WINBUR

RESIDENTIAL 3: 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114

INSTITUTIONAL: 575 /1202, 576 /1202

RESIDENTIAL 3: 551 /1202, 552 /1202, 553 /1202, 554 /1202, 555 /1202, 556 /1202, 557 /1202

P.O.S.: 578 /1202, 579 /1202, 581 /1202, 582 /1202, 584 /1202, 586 /1202, 587 /1202

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| DESIGNED BY: | | | | | PROJECT: | SKAAL/SCALE | DATE: | REVISION: |
|---|---|---|---|---|---|---|---|---|
| P.O. Box 8864<br>Verwoerd Park<br>1453<br><br>Tel: 011 902 4075<br>Fax: 086 547 8882<br>Cell: 082 854 7358 | NR | DATE | AMENDMENTS | ENGINEER | DATE | ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2<br><br>PROPOSED PUBLIC TRANSPORT AND PEDESTRIAN FACILITIES | 1:1000 | 07/02/12 0<br><br>PLAN NR./PLAN NO.<br>175-19-04 |

PTN 170 No.106-IR

KLIPRIVIERSBERG

VICKERS ROAD

ROAD CLOSED

PROPOSED BRT STATION - LAYOUT AND LOCATION OF THE STATION TO BE CONFIRMED DURING DETAIL PLANNING PHASE (NOT TO BE DESIGNED AS PART OF THIS STUDY).

EXISTING ROAD RESERVE

BRT STATION

Southern Klipriviersberg Road

NORTH

TAAIBOS CRESCENT 13m

STINKWOOD ROAD 13m

SALINGA STREET 10.5m

LEADWOOD ROAD 16m

POPLAR ROAD 13m

BOKBAAI ROAD 16m

SERING ROAD 13m

YELLOWWOOD CRESCENT 16m

WILLOW STREET 10.5m

WATTLE STREET 10.5m

AKASIA ROAD 13m

HOOKTHORN STREET 10.5m

COLUMBINE ROAD 13m

1075 RESIDENTIAL 3

1076 RESIDENTIAL 3

1077 RESIDENTIAL 3

1083 RESIDENTIAL 3

1084 RESIDENTIAL 3

1085 RESIDENTIAL 3

1086 RESIDENTIAL 3

1087 RESIDENTIAL 3

1088 RESIDENTIAL 3

1089 RESIDENTIAL 3

1090 RESIDENTIAL 3

1091 RESIDENTIAL 3

1092 RESIDENTIAL 3

1093 RESIDENTIAL 3

1094 RESIDENTIAL 3

1095 RESIDENTIAL 3

1134 INSTITUTIONAL

1135 INSTITUTIONAL

1158 P.O.S.

1159 P.O.S.

1160 P.O.S.

1161 P.O.S.

1162 P.O.S.

1163 P.O.S.

578 /1202 P.O.S.

579 /1202 P.O.S.

556 /1202 RESIDENTIAL 3

557 /1202 RESIDENTIAL 3

**LEGENG:**

- 2m PAVED SIDEWALK
- TAXI LAY-BY
- RAISED PEDESTRIAN CROSSING


DESIGNED BY:

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| NR | DATE | AMENDMENTS | ENGINEER | DATE |
|---|---|---|---|---|
| | | | | |

PROJECT:

**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

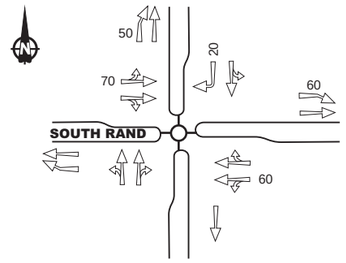
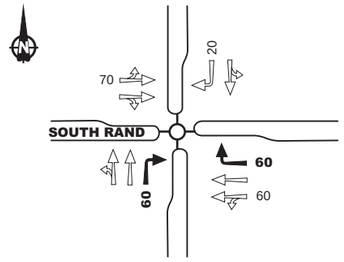
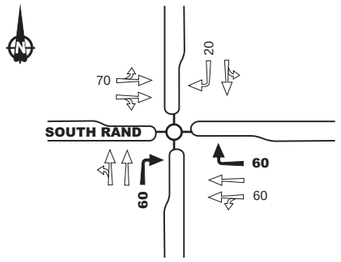
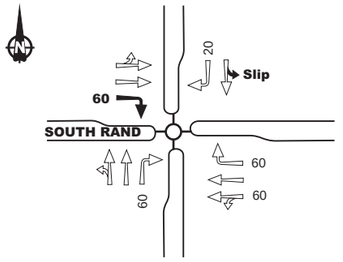
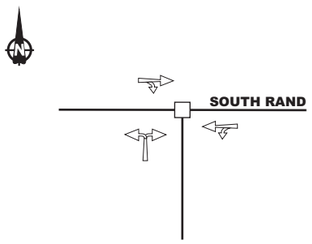
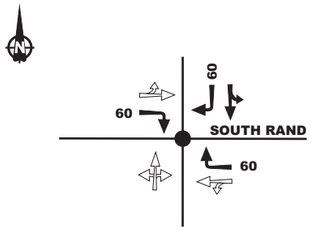
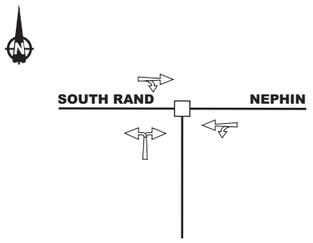
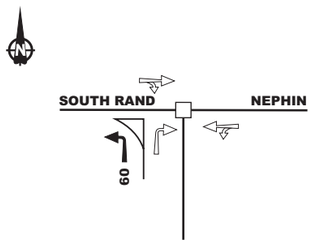
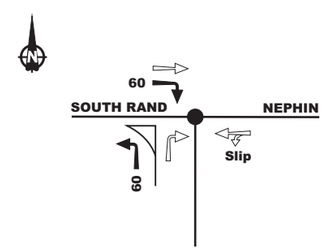
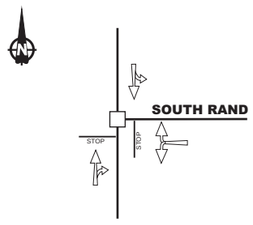
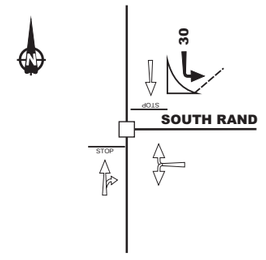
# PROPOSED PUBLIC TRANSPORT AND PEDESTRIAN FACILITIES

SKAAL/SCALE: 1:1000

DATE: 07/02/12

REVISION: 0

PLAN NR./PLAN NO.: 175-19-05

| DESCRIPTION | EXISTING LAYOUT | BACKGROUND TRAFFIC | | WITH DEVELOPMENT | |
|---|---|---|---|---|---|
| | | BASE YEAR 2012 | TARGET YEAR 2017 | BASE YEAR 2012 | TARGET YEAR 2017 |
| **SOUTH RAND & PLINLIMMON / JOHAN MEYER** |  SIGNALISED INTERSECTION | **OPTIMISE TRAFFIC SIGNAL SETTINGS** |  **OPTIMISE TRAFFIC SIGNAL SETTINGS** |  **OPTIMISE TRAFFIC SIGNAL SETTINGS** |  **OPTIMISE TRAFFIC SIGNAL SETTINGS** |
| **SOUTH RAND & AIDA** |  STOP CONTROL WITH PRIORITY ON SOUTH RAND | **NO ROAD UPGRADES REQUIRED** | **NO ROAD UPGRADES RECOMMENDED** |  **INSTALL TRAFFIC SIGNAL** | **OPTIMISE TRAFFIC SIGNAL SETTINGS** |
| **SOUTH RAND / NEPHIN & RISANA** |  STOP CONTROL WITH PRIORITY ON SOUTH RAND/NEPHIN | **NO ROAD UPGRADES REQUIRED** |  |  **INSTALL TRAFFIC SIGNAL** | **OPTIMISE TRAFFIC SIGNAL SETTINGS** |
| **SOUTH RAND & RISANA** |  STOP CONTROLLED WITH PRIORITY ON SOUTH BOUNDED APPROACH OF RISANA | **NO ROAD UPGRADES REQUIRED** | **NO ROAD UPGRADES REQUIRED** |  STOP CONTROL | **NO ROAD UPGRADES REQUIRED** |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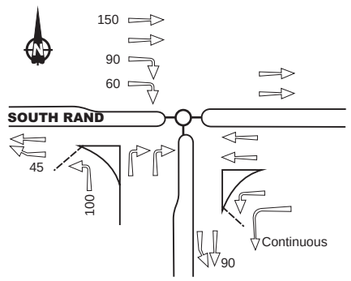
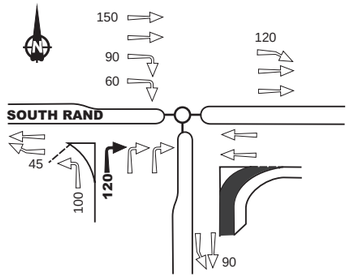
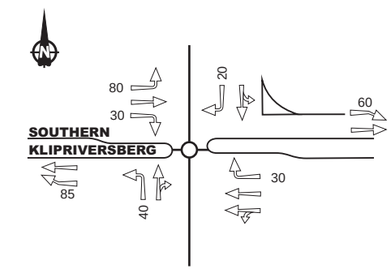
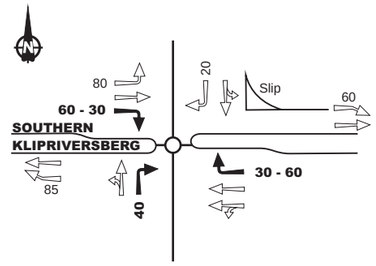
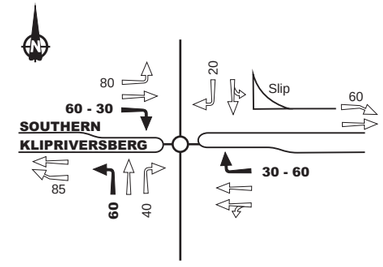
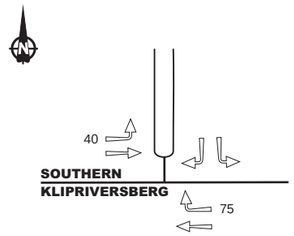
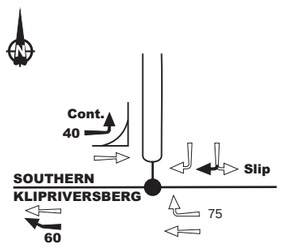
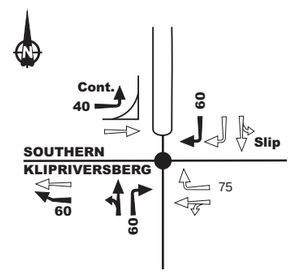
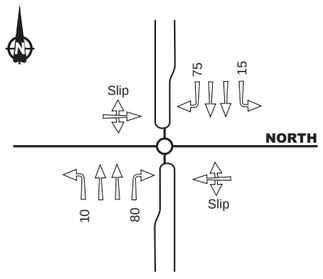
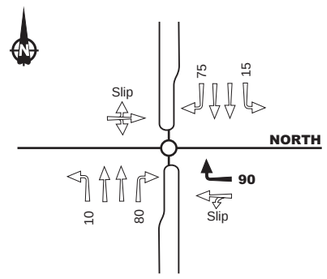
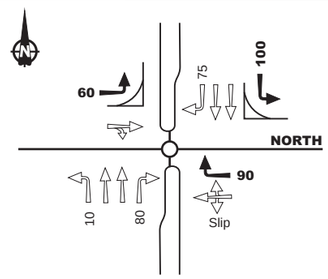
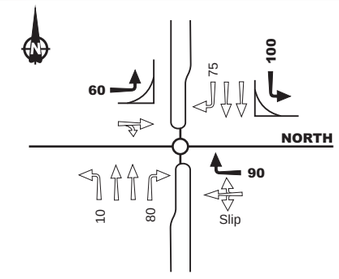
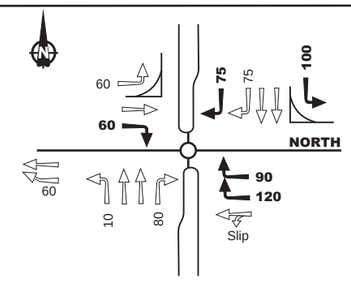
**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

# SCHEMATIC LAYOUT: PROPOSED ROAD NETWORK UPGRADES

**ANNEXURE**

**C1**

| DESCRIPTION | EXISTING LAYOUT | BACKGROUND TRAFFIC | | WITH DEVELOPMENT | |
|---|---|---|---|---|---|
| | | BASE YEAR 2012 | TARGET YEAR 2017 | BASE YEAR 2012 | TARGET YEAR 2017 |
| **SOUTH RAND & R59 / N12** |  SIGNALISED INTERSECTION |  **OPTIMISED TRAFFIC SIGNAL SETTINGS** | **OPTIMISED TRAFFIC SIGNAL SETTINGS** | **OPTIMISED TRAFFIC SIGNAL SETTINGS** | **OPTIMISED TRAFFIC SIGNAL SETTINGS** |
| **SOUTHERN KLIPRIVERSBERG & NORTH / NEPHIN** |  SIGNALISED INTERSECTION | NO ROAD UPGRADES REQUIRED |  **OPTIMISED TRAFFIC SIGNAL SETTINGS** |  **OPTIMISED TRAFFIC SIGNAL SETTINGS** | **OPTIMISED TRAFFIC SIGNAL SETTINGS** |
| **SOUTHERN KLIPRIVERSBERG & VICKERS** |  SIGNALISED INTERSECTION | NO ROAD UPGRADES REQUIRED |  **OPTIMISED TRAFFIC SIGNAL SETTINGS** |  **OPTIMISED TRAFFIC SIGNAL SETTINGS** | **OPTIMISED TRAFFIC SIGNAL SETTINGS** |
| **VICKERS & NORTH** |  SIGNALISED INTERSECTION |  **OPTIMISED TRAFFIC SIGNAL SETTINGS** |  **OPTIMISED TRAFFIC SIGNAL SETTINGS** |  **OPTIMISED TRAFFIC SIGNAL SETTINGS** |  **OPTIMISED TRAFFIC SIGNAL SETTINGS** |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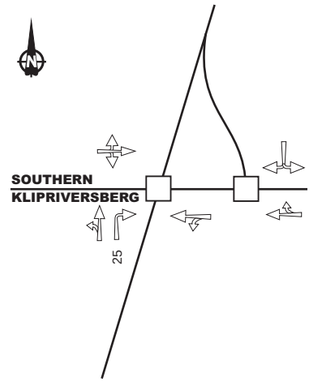
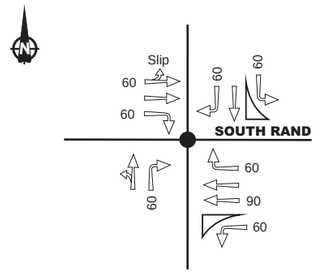
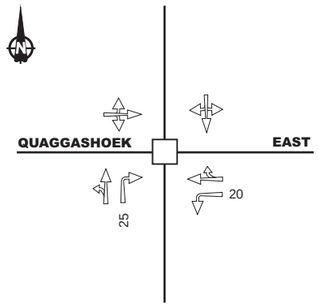
**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

# SCHEMATIC LAYOUT: PROPOSED ROAD NETWORK UPGRADES

**ANNEXURE**

**C2**

| DESCRIPTION | EXISTING LAYOUT | BACKGROUND TRAFFIC | | WITH DEVELOPMENT | |
|---|---|---|---|---|---|
| | | BASE YEAR 2012 | TARGET YEAR 2017 | BASE YEAR 2012 | TARGET YEAR 2017 |
| **SOUTHERN KLIPRIVERSBERG & EAST** |  STOP CONTROL WITH PRIORITY ON SOUTHERN KLIPRIVERSBERG | NO ROAD UPGRADES RECOMMENDED | THE REALIGNMENT OF EAST ROAD TO BE CONSIDERED WITH THE FOLLOWING ROAD UPGRADES  **INSTALL TRAFFIC SIGNAL** | | |
| **PLINLIMMON & EAST/QUAGGASHOEK** |  STOP CONTROL WITH PRIORITY ON PLINLIMMON | **NO ROAD UPGRADES RECOMMENDED; HOWEVER THE POSSIBILITY OF CONVERTING THE INTERSECTION TO A PARTIAL ACCESS TO BE CONSIDERED BY THE JRA.** | | | |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**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

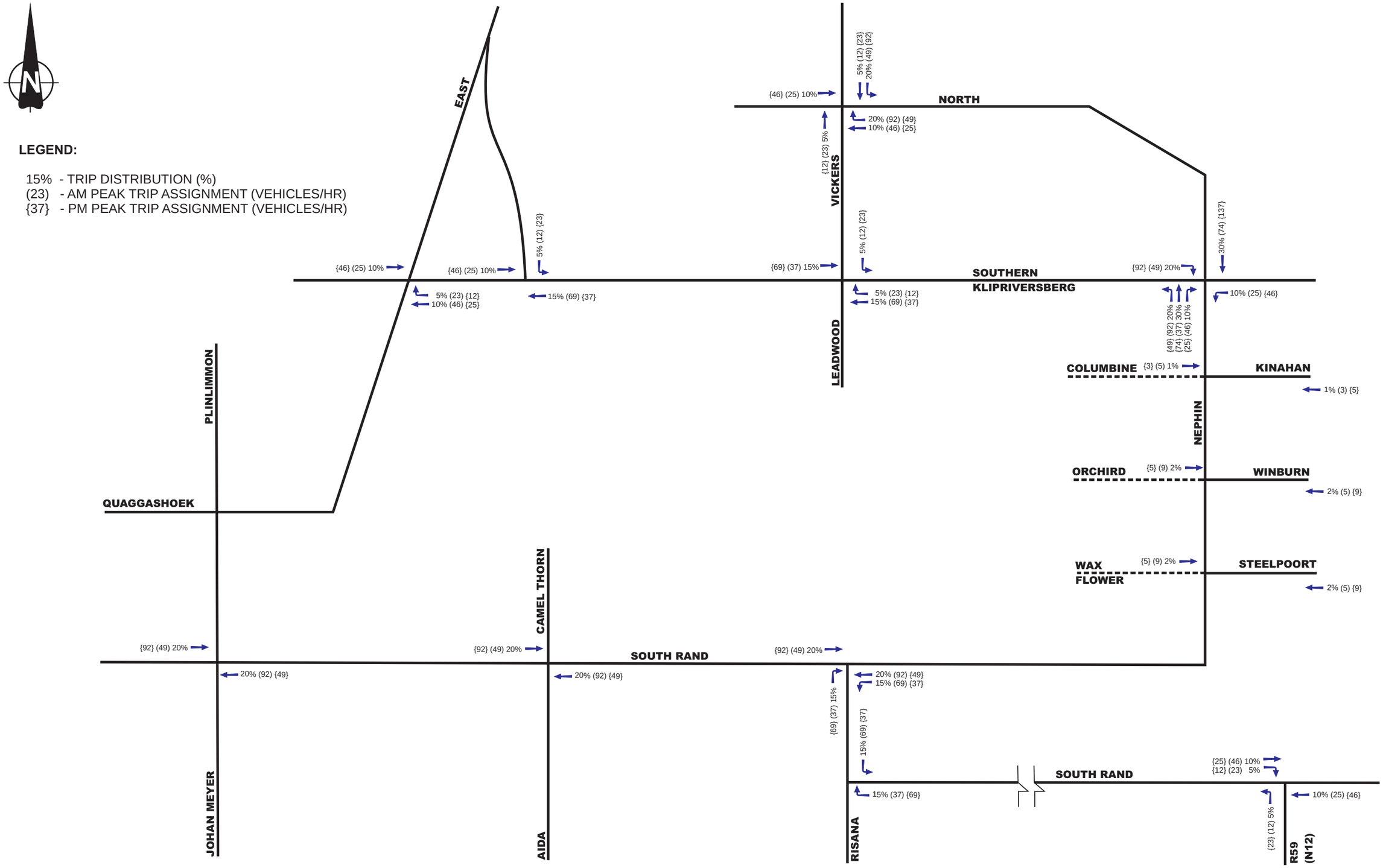
# SCHEMATIC LAYOUT: PROPOSED ROAD NETWORK UPGRADES

**ANNEXURE**

**C3**

**LEGEND:**

15% - TRIP DISTRIBUTION (%)
(23) - AM PEAK TRIP ASSIGNMENT (VEHICLES/HR)
{37} - PM PEAK TRIP ASSIGNMENT (VEHICLES/HR)





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**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

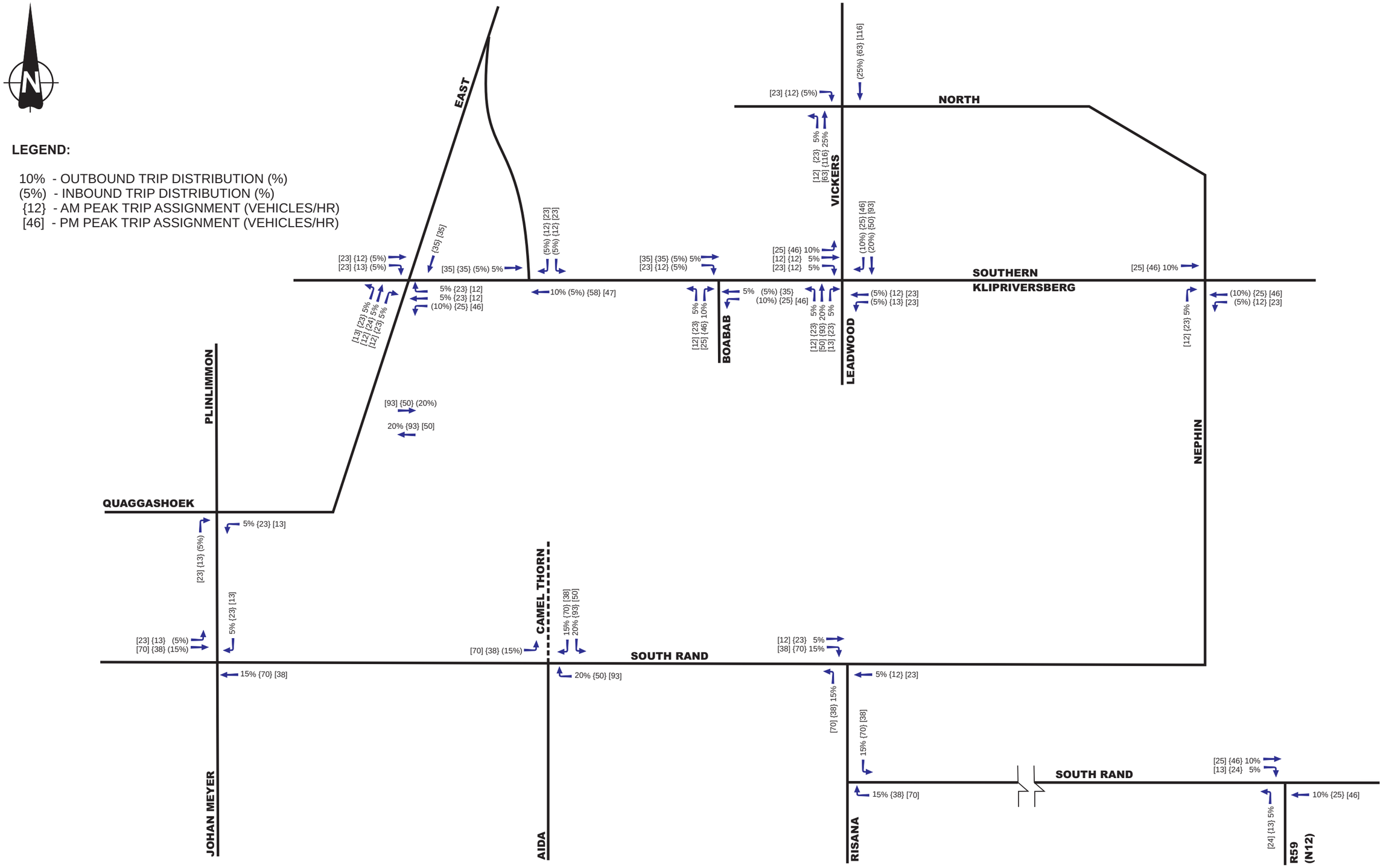
# TRIP GENERATION CHARACTERISTICS: RESIDENTIAL - EASTERN SECTION

**ANNEXURE**

**E1**

**LEGEND:**

10% - OUTBOUND TRIP DISTRIBUTION (%)
(5%) - INBOUND TRIP DISTRIBUTION (%)
{12} - AM PEAK TRIP ASSIGNMENT (VEHICLES/HR)
[46] - PM PEAK TRIP ASSIGNMENT (VEHICLES/HR)





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**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

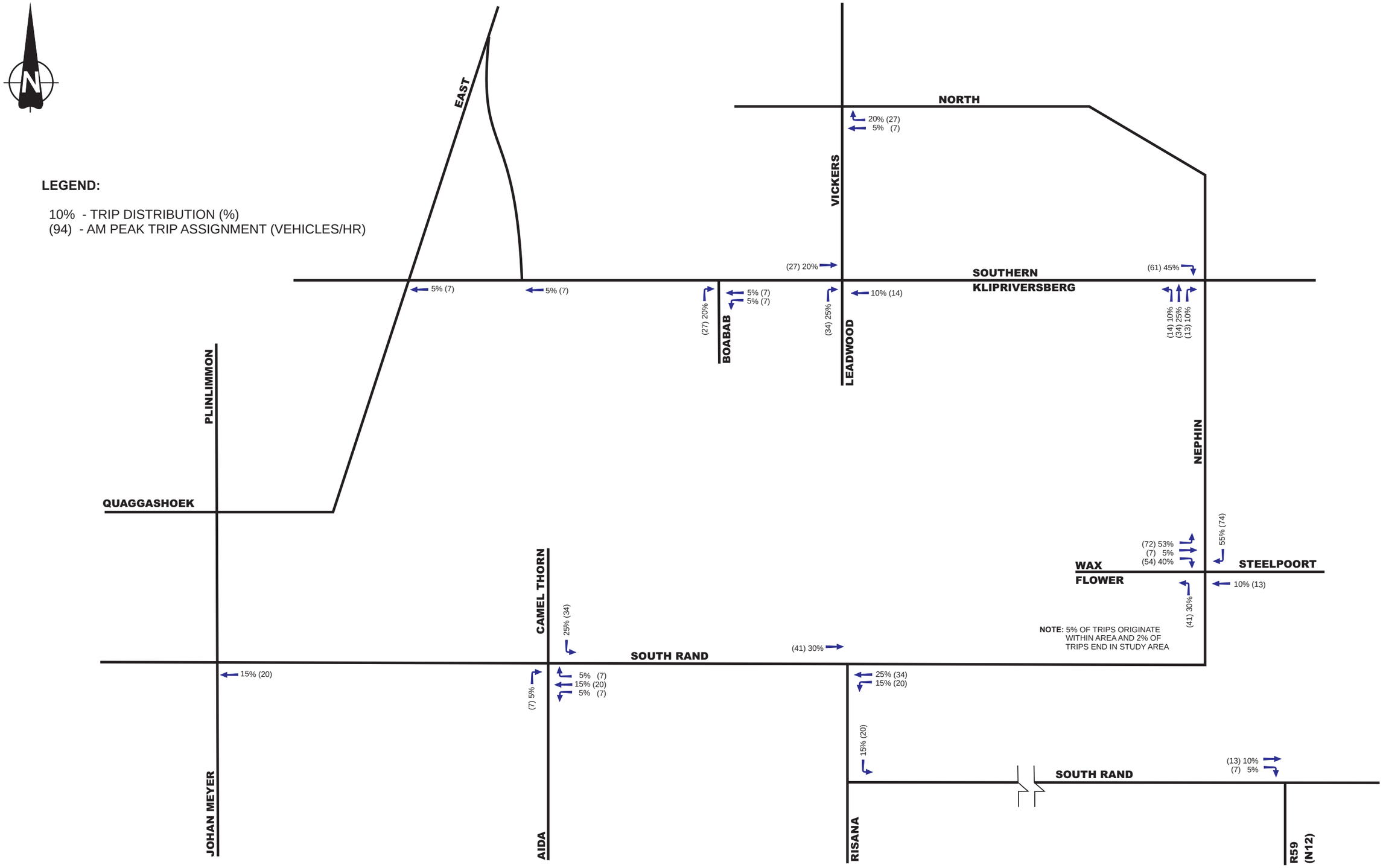
**TRIP GENERATION CHARACTERISTICS: RESIDENTIAL - WESTERN SECTION**

**ANNEXURE**

**E2**

**LEGEND:**

10% - TRIP DISTRIBUTION (%)
(94) - AM PEAK TRIP ASSIGNMENT (VEHICLES/HR)





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**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

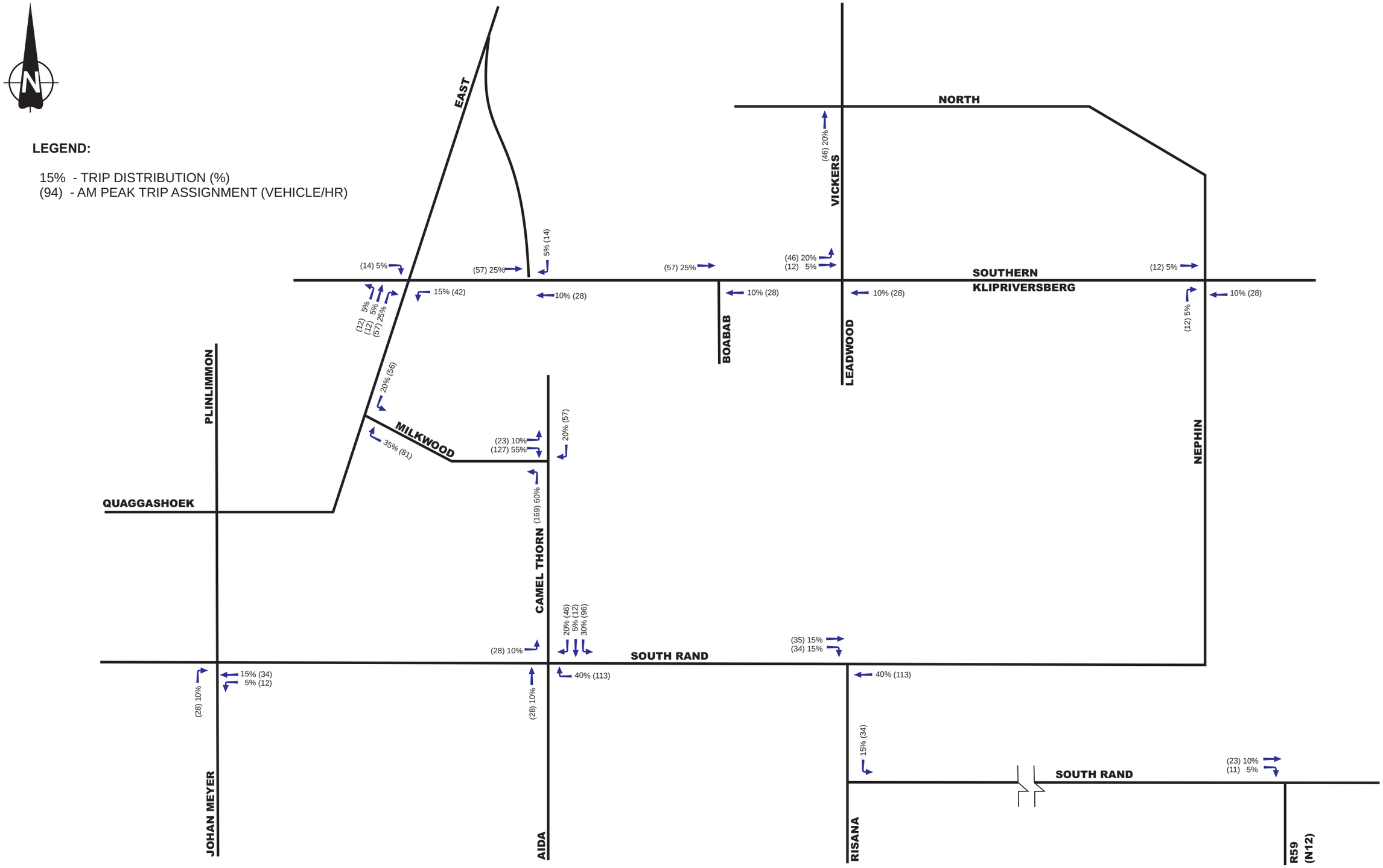
**TRIP GENERATION CHARACTERISTICS: PRIMARY SCHOOL (EASTERN SECTION)**

**ANNEXURE**

**E3**

**LEGEND:**

15% - TRIP DISTRIBUTION (%)
(94) - AM PEAK TRIP ASSIGNMENT (VEHICLE/HR)





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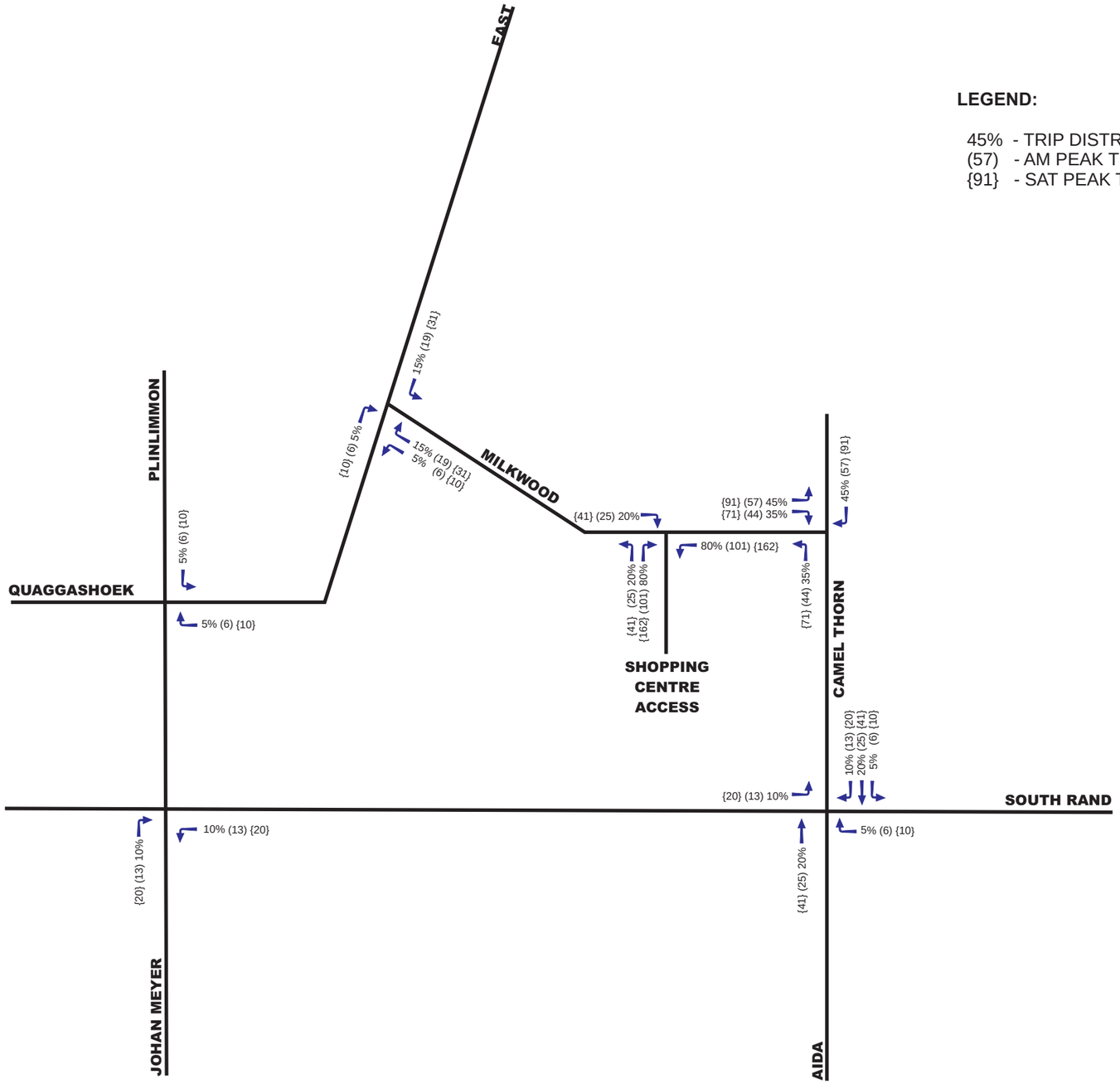
**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

# TRIP GENERATION CHARACTERISTICS: SECONDARY SCHOOL (WESTERN SECTION)

**ANNEXURE**

**E4**




**LEGEND:**

45% - TRIP DISTRIBUTION (%)
(57) - AM PEAK TRIP ASSIGNMENT (VEHICLES/HR)
{91} - SAT PEAK TRIP ASSIGNMENT (VEHICLES/HR)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**ERF 1202 SOUTH HILLS & PROPOSED TOWNSHIP SOUTH HILLS EXTENSION 2**

**TRIP GENERATION CHARACTERISTICS: RETAIL**

**ANNEXURE**

**E5**

# SOUTH HILLS EXT.2
# and ERF 1202 SOUTH HILLS

## LEGEND

| |
|---|
| 3 & 4 STOREY BNG RESIDENTIAL UNITS |
| 3 & 4 STOREY GAP RESIDENTIAL UNITS |
| 140m² RESIDENTIAL UNITS |
| 160m² RESIDENTIAL UNITS |
| 180m² RESIDENTIAL UNITS |
| 200m² RESIDENTIAL UNITS |
| 350m² RESIDENTIAL UNITS |
| PARK |
| BUSINESS |
| EDUCATIONAL |
| COMMUNITY FACILITY |


CALGRO M3 HOLDINGS

CTE CONSULTING
TOWN AND REGIONAL PLANNERS