






PROPOSED MOTOR DEALERSHIP ON PORTION 168 AND 59 OF THE FARM BULFONTEIN 533-JQ CITY OF JOHANNESBURG




TRAFFIC IMPACT ASSESSMENT (TIA) February 2019

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Quality Control

| Issue/revision | Issue 1 | | | | | | | | | |
|--|--|--|-------|---------|----------------------|---|---------------------------|---|--------------------------------|---|
| Remarks | Version 1.0 | | | | | | | | | |
| Date | 20 February 2019 | | | | | | | | | |
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| Project number | C154-061017 | | | | | | | | | |
| File reference | F:\C154-061017 - Ptn 168 Bulfontein 533-JQ2. TRAFFIC\05 Reports | | | | | | | | | |
| <p><u>Certification</u></p> <p><i>It is herewith certified that this Traffic Impact Assessment has been prepared according to requirements of the South African Traffic Impact and Site Traffic Assessment Manual.</i></p> <p style="text-align: center;"></p> <p>Signatory: _____ Date: <u>20 February 2019</u> ECSA no: <u>20170023</u></p> | | | | | | | | | | |
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| Items | Initial | | | | | | | | | |
| Project take on form | ✓ | | | | | | | | | |
| Report & Figures reviewed | ✓ | | | | | | | | | |
| Authorisation for distribution | ✓ | | | | | | | | | |



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1 Introduction

1.1 BACKGROUND

CHRISEN CONSULTING (PTY) LTD has been appointed to undertake a Traffic Impact Assessment for the proposed Motor Dealership on Portion 168 and 59 of the Farm Bulfontein 533-JQ. The site is located 2,5 km south from Lanseria Airport, at the north-eastern quadrant of the intersection of Pelindaba Road (R512) and 6th Road (R552) and falls within the City of Johannesburg area of jurisdiction. The site has recently been rezoned from “Agricultural Holdings” to “Industrial.” The zoning approval and the surveyor general (S.G.) diagram is contained in **Appendix A**.

A traffic Impact Study was done for Portion 168 of the Farm Bulfontein previously. However, the client has recently purchased Portion 59 of the farm Bulfontein and would like to consolidate the two sites. This study will be based on Portion 168 and 59 of the Farm Bulfontein 533-JQ. The site locality plan is illustrated on **Figures 1a** and **1b**.

1.2 PURPOSE OF THE REPORT

This study forms part of the Site Development Plan submission for the proposed Motor Dealership on Portion 168 and 59 of the Farm Bulfontein 533-JQ. Refer to the Site Plan contained in **Appendix A**. The purpose of this report is to evaluate the impact of the proposed Motor Dealership development on the adjacent road network and possible mitigation of the anticipated traffic impact. The assessment of the site access (spacing, ingress and egress lane configuration, bell-mouth radii, access control), on-site parking, vehicle manoeuvring within the site and stacking distance aspects will be discussed in this report.

1.3 APPROVAL OF SUBMISSION

This report will be submitted to the following road authorities for their comments and approval:

- Johannesburg Roads Agency (JRA)
- Gauteng Provincial Department of Roads and Transport (GPDRT)



2 Study Area and Surrounding Road Network

2.1 STUDY AREA

In determining the site area TMH 16 volume 1 recommends the following:

- *“Class 4 and 5 roads in the vicinity of the development up to the first Class 1 to 3 roads that can be reached by the Class 4 and 5 road network from the development, up to and including the first connection(s) on the Class 1 to 3 roads.*
- *The elements shall be restricted to those within a maximum distance of 1.5km from the accesses to the site, measured along the shortest routes to the accesses, provided that there is at least one intersection within this distance. Where there is no such intersection, the distance will be extended to include at least one intersection.”*

TMH 16 also states that judgement should be used in selecting the intersections considered and therefore specific elements like extent of the development were also considered. A larger development will by its nature require a wider study area to be considered while for a smaller development the opposite will be true.

2.2 EXISTING SURROUNDING ROAD NETWORK

The following roads within the vicinity of the proposed development site are regarded as relevant to this study:

- **N14:** This road is classified as a Class 1 provincial freeway having two lanes in each direction and runs in an east-west alignment near the vacuity of the site. Access to the subject site from the N14 can be gained from the Malibongwe Drive / Pelindaba Road (R512) terminal ramps which is located at 1,75 km south from the subject site.
- **Pelindaba Road:** This road is classified as a Class 2 major arterial dual carriageway road having two lanes in each direction and runs in a north-south alignment pass the site. Pelindaba Road provides an important link between Malibongwe Drive, N14 and Lanseria Airport.
- **6th Road:** This road is classified as a Class 2 major arterial dual carriageway. However, 6th Road currently has a single lane per direction and serves as an important link between Cedar Road and R114 (Old Krugersdorp Road). The provincial K33 alignment is planned



on 6th Road. The section of 6th Road (500,0 m) from Pelindaba Road has recently been upgraded having two lanes per direction with a centre median.

- **Elandsdrift Road:** This road is classified as a Class 2 major arterial dual carriageway. However, Elandsdrift Road currently has a single lane per direction. The provincial K33 alignment is planned on Elandsdrift Road. The section of Elandsdrift Road (500,0 m) from Pelindaba Road has recently been upgraded having two lanes per direction with a centre median.
- **Informal Settlement Road:** This road is classified as a Class 5 asphalt surfaced road (330,0 m) having an east-west alignment near the vicinity of the site. It is proposed that a connecting road from Informal Settlement Road be provided to service the site.

The City of Johannesburg Road Network Plan RISFSA Road Hierarchy Region A and the Gauteng Road Network Plan in relation to the site is contained in **Appendices B-1** and **B-2** respectively.

2.3 PLANNED ROAD NETWORK

The following roads within the vicinity of the proposed development site are regarded as relevant to this study:

- **K33:** The provincial K33 route is planned on 6th Road and Elandsdrift Road alignment.
- **K215:** The provincial K215 route is planned +1,0 km east from the intersection of Pelindaba Road and 6th Road. There is only route determination available for the K215 (no basic planning).

The Gauteng Road Network Plan in relation to the site is contained in **Appendix B-2**.



3 Approach and Methodology

3.1 GENERAL

The application will be undertaken according to the South African Traffic Impact and Site Traffic Assessment Manual (TMH 16, 2012). The horizon year for the purpose of the assessment for the impact on the transport system is 2024.

The site is situated adjacent to large vacant agricultural farmlands. There are some portions of land that have been developed recently, however there is still large pockets of undeveloped farms. The Traffic Impact Assessment takes into account the proposed developments impact on the road network as well as surrounding land uses and the possible mitigation of such an impact. This assessment also discusses non - motorised and public transport and provides the necessary requirements.

3.2 RELEVANT PEAK HOURS

From an observation of existing traffic and trip generation volumes, it has been established that the Weekday peak hour is critical for capacity analysis purposes. This will be when the existing network background traffic together with the development traffic will represent a worst-case scenario in terms of critical traffic flow.

3.3 DATA COLLECTION

3.3.1 Site Visit

During February 2019, a site visit was undertaken for this study and the following was confirmed:

- Layouts of intersections considered in the study
- Appropriateness of recommended site accesses
- Intersection control for relevant intersections
- Pedestrian movement / desire lines
- Presence of existing public transport and non-motorised transport facilities



3.3.2 Traffic Count Data

Traffic counts will be used to estimate the traffic demand and traffic volumes for the proposed development. A 12-hour vehicle (classified) was commissioned by CHRISEN on Wednesday, 18th October 2017 at the following intersections (Refer to **Figure 2**):

- Pelindaba Road / Access Road – informal settlement road (Intersection 1)
- Pelindaba Road / 6th Road (Intersection 2)
- N14 N/B Terminal Off-ramp/On-ramp / Pelindaba Road (Intersection 3)
- N14 S/B Terminal Off-ramp/On-ramp / Pelindaba Road (Intersection 4)
- 6th Road / R114 (Intersection 5)

Note: The traffic count data has been grown to the horizon year and applied for this study. It should be noted that the period within the date that the traffic count was commissioned and current date is over a year, Therefore, there has been low development within the surrounding of the site.

The traffic count data reveals that the common peak hour is as follows:

- AM Peak Hour 07:00 - 08:00
- PM Peak Hour 16:30 - 17:30

The 2019 peak hour traffic volumes are presented as **Figure 2**.

3.4 ANALYSIS SCENARIOS

The Weekday peak hour trip generation of the development was analysed. The critical peak hour analysis was considered for the following scenarios:

- **Scenario 1:** 2019 peak hour traffic volumes
- **Scenario 2a:** 2024 background plus development generated peak hour traffic volumes
- **Scenario 2b:** 2024 background plus development generated peak hour traffic volumes
(with upgrades if applicable)

This is in line with the TMH 16 requirement for scenarios to be considered in a Traffic Impact Assessment.



4 Existing Traffic Volumes

4.1 GENERAL

From the traffic count a common peak hour was determined (the busiest hour) for each counted period and was found to be:

- AM Peak Hour 07:00 - 08:00
- PM Peak Hour 16:30 - 17:30

The existing intersection layouts are illustrated on the SIDRA layouts contained in **Appendix D**.

4.2 PELINDABA ROAD / ACCESS ROAD (INTERSECTION 1)

This intersection has a stop two-way control (having priority in the north-south direction) and has approximately 2440 vph and 2220 vph during the AM and PM peak hours respectively. The Auto-J analysis results reveal that the intersection currently operates at an overall LOS A during both AM and PM peak hours.

4.3 6TH ROAD / PELINDABA ROAD (INTERSECTION 2)

This intersection is signalised and has approximately 3110 vph and 2710 vph during the AM and PM peak hours respectively. The SIDRA analysis results reveal that the intersection currently operates at an overall LOS C and LOS B during the AM and PM peak hours respectively.

4.4 N14 RAMP TERMINAL N.B / PELINDABA ROAD (INTERSECTION 3)

This intersection is signalised and has approximately 2530 vph and 2490 vph during the AM and PM peak hours respectively. The SIDRA analysis results reveal that the intersection currently operates at an overall LOS A and LOS D during the AM and PM peak hours respectively. The westbound right-turn movement has a LOS F during the PM peak hour which is due to the delay experienced as traffic is yielding for eastbound traffic. The westbound right turn lanes are 300,0 m and 12,0 m long and shares the same phase with eastbound traffic. It is proposed that



the traffic signal be re-programmed to accommodate a dedicated westbound phase which will improve the level of service for westbound traffic turning right.

4.5 N14 RAMP TERMINAL S.B / PELINDABA ROAD (INTERSECTION 4)

This intersection is signalised and has approximately 2580 vph and 1640 vph during the AM and PM peak hours respectively. The SIDRA analysis results reveal that the intersection currently operates at an overall LOS F and LOS A during the AM and PM peak hours respectively. The eastbound right-turn movement has a LOS F during the AM peak hour which is due to the delay experienced as traffic is yielding for westbound traffic. The eastbound right turn lane is 90,0 m long and shares the same phase with westbound traffic. It is proposed that the traffic signal be re-programmed to accommodate a dedicated eastbound phase which will improve the level of service for eastbound traffic turning right.

4.6 6TH ROAD / R114 (INTERSECTION 5)

This intersection is a stop two-way control (having priority in the north-south direction) and has approximately 1870 vph and 2510 vph during the AM and PM peak hours respectively. The SIDRA analysis results reveal that the intersection currently operates at an overall LOS B and LOS F during the AM and PM peak hours respectively. This intersection is warranted for a traffic signal. It is noted that the GDRT has appointed consultants to undertake the detailed design for the planned provincial K33 and K52 alignment's. The intersection of 6th Road / R114 and Cedar Road / R114 are staggered between each other and it is planned that the geometry of these staggered intersections be re-designed to a single intersection (K33 and K52).



5 Extent of the Development

The proposed motor dealership development will comprise of the following:

- Showrooms
- Administration
- Canteen and change rooms
- Parts
- Workshop
- Used car show room
- Used car administration
- Balcony
- Wash bay
- Valet bays and valet store
- Guard house
- Refuse area

The site comprises of an extent of 214 802,0 m² GLA and 20244,0 m² GLA was used to estimate the expected development generated trip. The schedule of areas is illustrated on the site plan contained in **Appendix A**.



6 Site Access

6.1 PROPOSED ACCESS

It is proposed that access to the Motor Dealership on Portion 168 and 59 of the Farm Bulfontein 533-JQ be taken from an internal road system. Refer to **Drawings SKC001** and **SKC002** illustrating two alternative access arrangements to the subject site.

The access is to be used by both light and heavy vehicle's and should be designed as follows:

- Two (2) ingress lanes (3,5 m wide lane for light vehicle's only and a 4,5 m wide lane for both heavy and light vehicle's).
- One (1) egress lane (4,5 m wide lane for both heavy and light vehicle's).
- The access control device is to be set back at least 30,0 m from the internal road.
- The bell mouth radii as illustrated on **Drawings SKC001 and SKC002**.
- The proposed access is to be designed according to the Johannesburg Roads Agency (JRA) Roads and Stormwater design guidelines together with the Urban Transport Guideline (UTG 10) for the geometric design of commercial and industrial local streets.

6.2 QUEUING ANALYSIS AND REQUIRED VEHICLE STACKING DISTANCE

A queuing analysis was undertaken to determine the stacking distance required at the entrance to the proposed development site. The access control will comprise of boom gates and a twenty-four (24) hour manned security. The design service rate of 225 vph per lane was applied (coded - card reader). The arrival rate of **289 vph** was used as this is the highest number of trips entering the site (AM peak hour).

Table 1 illustrates the queuing analysis results which reveal that a 30,0 m stacking distance is required at the access point. However, it is recommended that a stacking distance of 30,0 m be provided at the site access to accommodate any queuing that may develop. Note, that 2 ingress lanes are required (the 4,5 m wide lane for heavy vehicle's and light vehicle's and a 3,5 m wide lane for light vehicle's only).



Table 1: Queuing analysis

| Proposed Motor Dealership on Portion 168 and 59, Bulfontein 533-JQ C339-011118 | | |
|---|---|-------------------|
| Variables used : | | |
| Arrival rate | = 289 | vehicles per hour |
| Service rate per lane | = 225 | vehicles per hour |
| Number of lanes | = 2 | lanes |
| Calculation : | | |
| Utilisation factor (q) | = $\frac{\text{Arrival rate}}{(\text{number of lanes}) * (\text{service rate per lane})}$ | |
| | = 0,642 | |
| Qm | = Relationship between queue length, number of channels, and utilisation factor | |
| Qm (by interpolation) = | = 0,504 | |
| Queue length exceeded 95% of time | = $\left[\frac{\ln 0.05 - \ln (Qm)}{\ln (q)} \right] - 1$ | |
| | = 4,22 vehicles | |
| Say | = 5,00 vehicles | |
| Required stacking length | = 30 meters | |
| Source : Transportation and Land Development (Vergil G Stover / Frank J. Koepke), ITE | | |

6.3 SHOULDER SIGHT DISTANCE

The UTG 10 manual provides the recommended sight triangle dimensions for accesses within the vicinity of commercial and industrial local streets. The proposed access position to the development site meets the minimum shoulder sight distance requirements outlined in UTG 10 (Table 8.2, Page 47). The access road (side road) has a natural gradient of approximately 3,0% and the shoulder sight distance achieved is between 150,0 to 200,0 m.



7 Development Trip Generation and Traffic Volume Scenarios

7.1 TRIP SUMMARY

The South African Trip Data Manual, (TMH17 version 1.01, September 2013) was used to estimate the trip generation for the proposed Motor Dealership.

The document recommends the following trip generation for a Motor Dealership land use (TMH 17 Code 841):

- AM peak hour 2.20 trips per 100 m² GLA, with a 65:35 in and out split
- PM peak hour 2.30 trips per 100 m² GLA, with a 50:50 in and out split

The expected development generated trips for the AM and PM peak hours are indicated in **Table 2**. **Table 2** shows that the proposed development is expected to generate approximately **445 vph** and **466 vph** during the AM and PM peak hours respectively. The Manual for Traffic Impact Studies requires that a Traffic Impact Assessment be undertaken for developments which generate more than 50 peak hour trips. The detailed trip generation calculations are contained in **Appendix C**.

Table 2: Expected peak hour development generated trips summary

| Land Use | Extent | AM Peak Hour | | | PM Peak Hour | | |
|------------------|--------------------------|--------------|-----|------------|--------------|-----|------------|
| | | In | Out | Total | In | Out | Total |
| Motor Dealership | 20244 m ² GLA | 289 | 156 | 445 | 233 | 233 | 466 |



7.2 GROWTH RATE

TMH 16 Volume 1 requires that a five-year horizon be considered for developments that generate more than 50 trips. TMH 17 recommends growth rates for developments as shown in **Table 3**.

Table 3: Typical traffic growth rates

| DEVELOPMENT AREA | GROWTH RATES |
|---------------------------------|--------------|
| Low growth areas | 0 – 3% |
| Average growth areas | 3 – 4% |
| Above average growth areas | 4 – 6% |
| Fast growing areas | 6 – 8% |
| Exceptionally high growth areas | >8% |

In order to determine the 2024 background traffic volumes, a growth rate of 2% per annum will be applied to the 2019 weekday traffic volumes.

7.3 TRAFFIC VOLUME SCENARIOS

The existing 2019 peak hour traffic volumes (see **Figure 2**) were thus subjected to a 2% growth rate over five years; this is in line with an “low growth rate” as given in **Table 3**. The 2024 background peak hour traffic volumes are presented on **Figure 3**.

The following scenarios were analysed in this study:

- **Scenario 1:** 2019 peak hour traffic volumes
- **Scenario 2a:** 2024 background plus development generated peak hour traffic volumes
- **Scenario 2b:** 2024 background plus development generated peak hour traffic volumes **(with upgrades if applicable)**



7.4 TRIP DISTRIBUTION AND ASSIGNMENT

Assumptions with respect to the expected trip distribution were based on the location of the site access in relation to the surrounding road network; the existing traffic volumes, travel patterns as well as the land use nature of the proposed development.

The expected trip distribution and assignment of the proposed development can be seen on **Figure 4** and **Figure 5** respectively. The 2024 background plus development generated peak hour traffic volumes are presented on **Figure 6**.



8 Traffic Impact and Capacity Analyses

8.1 SCENARIOS ANALYSED

The AM and PM peak hour trip generation of the development was analysed. The critical peak hour analysis was considered for the following scenarios:

- **Scenario 2a:** 2024 background plus development generated peak hour traffic volumes
- **Scenario 2b:** 2024 background plus development generated peak hour traffic volumes
(with upgrades if applicable)

This is in line with the TMH16 document requirement for scenarios to be considered in a Traffic Impact Assessment.

8.2 CAPACITY ANALYSIS

8.2.1 Pelindaba Road / Access Road (Intersection 1)

- **Scenario 2a: 2024 Background plus Development Generated Peak Hour Traffic Volumes**

The Auto-J analysis results illustrate that this intersection is expected to perform at an overall LOS A during both the AM and PM peak hours. It should be noted that overall level of service at the east approach during the AM and PM peak hours is poor (LOS F) and therefore intersection improvements is recommended. The summary of the Auto-J analysis results is contained in **Table 4a**.



Table 4a: Summary of Auto-J intersection capacity analysis results

Pelindaba Road / Access Road Intersection, Scenario 2a

CONTROL: STOP TWO-WAY

| APPROACH | | OPERATING CONDITIONS | | | | | |
|--------------|----------|----------------------|--------------|-----|--------------|--------------|-----|
| | | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | V/C | DELAYS (SEC) | LOS | V/C | DELAYS (SEC) | LOS |
| NORTH BOUND | LEFT | 0,00 | 0,0 | A | 0,00 | 0,00 | A |
| | THROUGH | 0,42 | 3,0 | A | 0,27 | 1,0 | A |
| | RIGHT | 0,43 | 3,0 | A | 0,53 | 4,0 | B |
| | APPROACH | 0,42 | 3,0 | A | 0,31 | 2,0 | A |
| WEST BOUND | LEFT | 1,00 | 82,0 | F | 1,40 | 600,0 | F |
| | THROUGH | 1,99 | 988,0 | F | 2,77 | 1244,0 | F |
| | RIGHT | 1,00 | 84,0 | F | 1,40 | 602,0 | F |
| | APPROACH | 1,00 | 87,0 | F | 1,43 | 614,0 | F |
| SOUTH BOUND | LEFT | 0,02 | 0,0 | A | 0,01 | 0,0 | A |
| | THROUGH | 0,23 | 1,0 | A | 0,32 | 2,0 | A |
| | RIGHT | 0,02 | 0,0 | A | 0,02 | 0,0 | A |
| | APPROACH | 0,22 | 1,0 | A | 0,31 | 2,0 | A |
| EAST BOUND | LEFT | 0,72 | 17,0 | B | 0,25 | 9,0 | A |
| | THROUGH | 1,41 | 615,0 | F | 0,48 | 13,0 | B |
| | RIGHT | 0,72 | 17,0 | B | 0,25 | 10,0 | A |
| | APPROACH | 0,75 | 42,0 | B | 0,26 | 10,0 | A |
| ALL VEHICLES | | 0,40 | 8,0 | A | 0,41 | 59,0 | A |

➤ **Scenario 2b: 2024 Background plus Development Generated Peak Hour Traffic Volumes (with upgrades)**

Intersection upgrades have been conducted in this scenario to accommodate the background plus expected development traffic demand.

The following upgrades are required:

- A dedicated short right-turn lane (30,0 m) is required at the east approach (access road)
- The existing lane at the east approach is to be converted to a shared left and through lane
- A dedicated short right-turn lane (30,0 m) is required at the west approach
- The existing lane at the west approach is to be converted to a shared left and through lane



The Auto-J intersection analysis results of the upgraded intersection indicates that the intersection is expected to perform at an overall LOS A during both the AM and PM peak hours. The summary of the Auto-J intersection analysis results is contained in **Table 4b**. Refer to **Drawing SKC001**.

Table 4b: Summary of Auto-J intersection capacity analysis results
Pelindaba Road / Access Road Intersection, Scenario 2b (with upgrades)
CONTROL: STOP TWO-WAY

| APPROACH | | OPERATING CONDITIONS | | | | | |
|--------------|----------|----------------------|--------------|-----|--------------|--------------|-----|
| | | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | V/C | DELAYS (SEC) | LOS | V/C | DELAYS (SEC) | LOS |
| NORTH BOUND | LEFT | 0,000 | 0,0 | A | 0,010 | 0,0 | A |
| | THROUGH | 0,420 | 3,0 | A | 0,270 | 1,0 | A |
| | RIGHT | 0,430 | 3,0 | A | 0,530 | 4,0 | A |
| | APPROACH | 0,420 | 3,0 | A | 0,310 | 2,0 | A |
| WEST BOUND | LEFT | 0,270 | 10,0 | A | 0,560 | 12,0 | A |
| | THROUGH | 0,540 | 14,0 | B | 1,100 | 257,0 | B |
| | RIGHT | 0,680 | 16,0 | B | 0,780 | 21,0 | C |
| | APPROACH | 0,340 | 11,0 | A | 0,600 | 19,0 | B |
| SOUTH BOUND | LEFT | 0,020 | 0,0 | A | 0,010 | 0,0 | A |
| | THROUGH | 0,230 | 1,0 | A | 0,320 | 2,0 | A |
| | RIGHT | 0,020 | 0,0 | A | 0,020 | 0,0 | A |
| | APPROACH | 0,220 | 1,0 | A | 0,310 | 2,0 | A |
| EAST BOUND | LEFT | 0,040 | 8,0 | A | 0,030 | 8,0 | A |
| | THROUGH | 0,070 | 9,0 | A | 0,060 | 9,0 | A |
| | RIGHT | 0,630 | 14,0 | B | 0,000 | 9,0 | A |
| | APPROACH | 0,410 | 12,0 | A | 0,110 | 9,0 | A |
| ALL VEHICLES | | 0,360 | 3,0 | A | 0,330 | 2,0 | A |



8.2.2 6th Road / Pelindaba Road (Intersection 2)

➤ Scenario 2a: 2024 Background plus Development Generated Peak Hour Traffic Volumes

The SIDRA analysis results indicate that the existing intersection will perform at an overall LOS D and LOS C during the AM and PM peak hours respectively. The summary of the SIDRA intersection results is contained in **Table 5**.

Table 5: Summary of SIDRA intersection capacity analysis results
6th Road / Pelindaba Road Intersection, Scenario 2a

CONTROL: TRAFFIC SIGNAL

| APPROACH | | OPERATING CONDITIONS | | | | | |
|--------------|----------|----------------------|--------------|-----|--------------|--------------|-----|
| | | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | V/C | DELAYS (SEC) | LOS | V/C | DELAYS (SEC) | LOS |
| NORTH BOUND | LEFT | 0,058 | 6,3 | A | 0,089 | 6,9 | A |
| | THROUGH | 0,937 | 42,6 | D | 0,444 | 10,9 | B |
| | RIGHT | 0,992 | 65,4 | E | 0,401 | 21,2 | C |
| | APPROACH | 0,992 | 45,9 | D | 0,444 | 11,5 | B |
| WEST BOUND | LEFT | 0,159 | 22,5 | C | 0,374 | 28,6 | C |
| | THROUGH | 0,033 | 15,9 | B | 0,073 | 20,7 | C |
| | RIGHT | 0,955 | 63,0 | E | 0,808 | 39,1 | D |
| | APPROACH | 0,955 | 52,5 | D | 0,808 | 33,2 | C |
| SOUTH BOUND | LEFT | 0,295 | 9,7 | A | 0,213 | 6,9 | A |
| | THROUGH | 0,921 | 47,2 | D | 0,800 | 25,5 | C |
| | RIGHT | 0,309 | 45,9 | D | 0,276 | 23,6 | C |
| | APPROACH | 0,921 | 37,5 | D | 0,800 | 22,0 | C |
| EAST BOUND | LEFT | 0,066 | 21,8 | C | 0,080 | 26,3 | C |
| | THROUGH | 0,037 | 15,9 | B | 0,028 | 20,2 | C |
| | RIGHT | 0,188 | 24,4 | C | 0,288 | 33,5 | C |
| | APPROACH | 0,188 | 21,3 | C | 0,288 | 28,7 | C |
| ALL VEHICLES | | 0,992 | 43,5 | D | 0,808 | 20,8 | C |



8.2.3 N14 Ramp Terminal N.B / Pelindaba Road (Intersection 3)

➤ Scenario 2a: 2024 Background plus Development Generated Peak Hour Traffic Volumes

The SIDRA analysis results indicate that the existing intersection will perform at an overall LOS C during both the AM and PM peak hours. The summary of the SIDRA intersection results is contained in **Table 6**.

**Table 6: Summary of SIDRA intersection capacity analysis results
N14 Ramp Terminal N.B / Pelindaba Road Intersection, Scenario 2a
CONTROL: TRAFFIC SIGNAL**

| APPROACH | | OPERATING CONDITIONS | | | | | |
|--------------|----------|----------------------|--------------|-----|--------------|--------------|-----|
| | | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | V/C | DELAYS (SEC) | LOS | V/C | DELAYS (SEC) | LOS |
| NORTH BOUND | THROUGH | 0,810 | 19,3 | B | 0,860 | 33,2 | C |
| | RIGHT | 0,761 | 64,6 | E | 0,844 | 37,1 | D |
| | APPROACH | 0,810 | 22,3 | C | 0,860 | 34,3 | C |
| SOUTH BOUND | LEFT | 0,282 | 16,6 | B | 0,813 | 31,9 | C |
| | THROUGH | 0,282 | 11,8 | B | 0,813 | 28,6 | C |
| | APPROACH | 0,282 | 12,2 | B | 0,813 | 29,1 | C |
| EAST BOUND | LEFT | 0,681 | 45,0 | D | 0,713 | 28,9 | C |
| | THROUGH | 0,681 | 39,3 | D | 0,713 | 23,2 | C |
| | RIGHT | 0,681 | 44,9 | D | 0,713 | 28,8 | C |
| APPROACH | | 0,681 | 44,9 | D | 0,713 | 28,8 | C |
| ALL VEHICLES | | 0,810 | 21,0 | C | 0,860 | 31,4 | C |



8.2.4 N14 Ramp Terminal S.B / Pelindaba Road (Intersection 4)

➤ Scenario 2a: 2024 Background plus Development Generated Peak Hour Traffic Volumes

The SIDRA analysis results indicate that the existing intersection will perform at an overall LOS C and LOS A during the AM and PM peak hours respectively. The summary of the SIDRA intersection results is contained in **Table 7**.

**Table 7: Summary of SIDRA intersection capacity analysis results
N14 Ramp Terminal S.B / Pelindaba Road Intersection, Scenario 2a
CONTROL: TRAFFIC SIGNAL**

| APPROACH | | OPERATING CONDITIONS | | | | | |
|--------------|----------|----------------------|--------------|-----|--------------|--------------|-----|
| | | AM PEAK HOUR | | | PM PEAK HOUR | | |
| | | V/C | DELAYS (SEC) | LOS | V/C | DELAYS (SEC) | LOS |
| NORTH BOUND | LEFT | 0,759 | 28,2 | C | 0,256 | 10,6 | B |
| | THROUGH | 0,759 | 19,9 | B | 0,256 | 5,7 | A |
| | APPROACH | 0,759 | 20,9 | C | 0,256 | 6,1 | A |
| WEST BOUND | LEFT | 0,190 | 7,5 | A | 0,142 | 7,0 | A |
| | THROUGH | 0,752 | 38,6 | D | 0,280 | 57,4 | E |
| | RIGHT | 0,752 | 44,2 | D | 0,280 | 63,1 | E |
| | APPROACH | 0,752 | 27,1 | C | 0,280 | 26,0 | C |
| SOUTH BOUND | THROUGH | 0,305 | 13,4 | B | 0,295 | 6,1 | A |
| | RIGHT | 0,775 | 28,0 | C | 0,113 | 8,7 | A |
| | APPROACH | 0,775 | 19,0 | B | 0,295 | 6,2 | A |
| ALL VEHICLES | | 0,775 | 21,2 | C | 0,295 | 7,7 | A |



9 Proposed Upgrades

9.1 PROPOSED INTERSECTION 1 UPGRADES

It is proposed that Intersection 1 be upgraded as follows:

- A dedicated short right-turn lane (30,0 m) is required at the east approach (access road)
- The existing lane at the east approach is to be converted to a shared left and through lane
- A dedicated short right-turn lane (30,0 m) is required at the west approach
- The existing lane at the west approach is to be converted to a shared left and through lane.

9.2 INTERSECTION 5 UPGRADES

Gautrans has approved the design for the future upgrades on 6th Road and R114 intersection (Intersection 5) that was undertaken by the WSP Consulting Engineers. The environmental authorisation is currently underway and is expected to be constructed within the next five (5) years.

9.3 PROPOSED RE-SURFACING OF GRAVEL ROAD (ACCESS ROAD TO THE SITE)

It is proposed that access road to the site be upgraded as follows:

- The road pavement is to be surfaced and layer-works designed to accommodate heavy vehicle's (car carriers)



9.4 PROPOSED SITE ACCESS

It is proposed that the access to the site be designed as follows:

- Two (2) ingress lanes (3,5 m wide lane for light vehicle's only and a 4,5 m wide lane for both heavy and light vehicle's).
- One (1) egress lane (4,5 m wide lane for both heavy and light vehicle's).
- The access control device is to be set back at least 25,0 m from the internal road.
- The bell mouth radii as illustrated on **Drawings SKC001 and SKC002**.
- The proposed access is to be designed according to the Johannesburg Roads Agency (JRA) Roads and Stormwater design guidelines together with the Urban Transport Guideline (UTG 10) for the geometric design of commercial and industrial local streets.

9.5 PROPOSED PAVED SIDEWALKS

It is proposed that 2,0 m wide paved sidewalk be provided along the site frontage which will ease and formalise the movement of pedestrians between the site access and public transport facilities. Refer to **Drawing SKC001**.



10 Parking

Refer to the Site Plan contained in **Appendix A**. The site will be able accommodate 630 parking bays. The parking bays will be 90 degrees, having dimensions of 5,0 m long by 2,5 m wide and a minimum aisle width of 7,5 m. This is in line with the DOT (1995) parking standards. Safe pedestrian crossings and walkways should be provided to direct pedestrians between pedestrian accesses, parking areas and the buildings.

The parking schedule requirements and calculations are illustrated in **Table 8**.

Table 8: Parking calculation

| Parking Ratio Requirements | Area | Parking Bays Required | Parking Bays Provided |
|---|-------------------------|-----------------------|-----------------------|
| 2 bays / 100 m ² GLA for showrooms | 7971 m ² GLA | 159 bays | 1812 bays |
| 4 bays / 100 m ² GLA for admin | 3639 m ² GLA | 146 bays | |
| 6 bays / 100 m ² GLA for workshop | 7267 m ² GLA | 436 bays | |
| 2 bays / 100 m ² GLA for parts | 1367 m ² GLA | 27 bays | |
| | Total: | 768 bays | |



11 Internal Circulation

11.1 GENERAL

A vehicle manoeuvring assessment was undertaken for the development site using the Auto-TURN software. A heavy vehicle and an emergency vehicle (fire truck) were tested in the simulation as discussed below.

11.2 HEAVY VEHICLE

The results of the heavy vehicle (22,0 m truck) simulation indicated that the site will be able to accommodate a 22,0 m long truck at the site access and on the internal road within the site.

11.3 EMERGENCY VEHICLE

The results of the vehicle simulation (10,0 m aerial fire truck) indicated that the site will be able to accommodate a fire truck at the site access and on the internal road within the site.



12 Non-motorised and Public Transport

12.1 BACKGROUND

In terms of the National Land Transport Act 5 of 2009, Section 38, it is a requirement that an assessment of the public transport be included in a Traffic Study.

12.2 EXISTING PUBLIC TRANSPORT SERVICES

The area surrounding the proposed development site is currently served by the following public transport services:

MINIBUS TAXIS AND BUSES

Minibus taxis and buses were observed operating along Pelindaba Road and 6th Road.

BUS / TAXI LAYBYS

There is currently a pair of bus/taxi laybys provided at the intersection of Pelindaba and 6th Road on the southbound and northbound directions.

12.3 PROPOSED / NEW FACILITIES

PROPOSED PAVED SIDEWALKS

It is proposed that 2,0 m wide paved sidewalk be provided along the site frontage which will ease and formalise the movement of pedestrians between the site access and public transport facilities. Refer to **Drawing SKC001**.



13 Conclusions and Recommendations

The following conclusions and recommendations can be made based on the findings of this report:

- The report pertains to the Traffic Impact Assessment for a proposed Motor Dealership on Portion 168 and 59 of the Farm Bulfontein 533-JQ.
- The site is located 2,5 km south from Lanseria Airport, at the north-eastern quadrant of the intersection of Pelindaba Road (R512) and 6th Road (R552) and falls within the City of Johannesburg area of jurisdiction. The site has recently been rezoned from “Agricultural Holdings” to “Industrial.”
- A traffic Impact Study was done for Portion 168 of the Farm Bulfontein previously. However, the client has recently purchased Portion 59 of the farm Bulfontein and would like to consolidate the two sites. This study will be based on Portion 168 and 59 of the Farm Bulfontein 533-JQ.
- The site comprises of an extent of 214 802,0 m² GLA and 20244,0 m² GLA will comprise of the following:
 - Showrooms
 - Administration
 - Canteen and change rooms
 - Parts
 - Workshop
 - Used car show room
 - Used car administration
 - Balcony
 - Wash bay
 - Valet bays and valet store
 - Guard house
 - Refuse area
- It is proposed that access to Portion 168 and 59 of the Farm Bulfontein 533-JQ be taken from an internal road system.



- The access is to be used by both light and heavy vehicle's and should be designed as follows:
 - Two (2) ingress lanes (3,5 m wide lane for light vehicle's only and a 4,5 m wide lane for both heavy and light vehicle's).
 - One (1) egress lane (4,5 m wide lane for both heavy and light vehicle's).
 - The access control device is to be set back at least 30,0 m from the internal road.
 - The bell mouth radii as illustrated on **Drawings SKC001** and **SKC002**.
 - The proposed access is to be designed according to the Johannesburg Roads Agency (JRA) Roads and Stormwater design guidelines together with the Urban Transport Guideline (UTG 10) for the geometric design of commercial and industrial local streets.
- The proposed development is expected to generate approximately **445 vph** and **466 vph** during the AM and PM peak hours respectively.
- It is proposed that Intersection 1 be upgraded as follows:
 - A dedicated short right-turn lane (30,0 m) is required at the east approach (access road)
 - The existing lane at the east approach is to be converted to a shared left and through lane
 - A dedicated short right-turn lane (30,0 m) is required at the west approach
 - The existing lane at the west approach is to be converted to a shared left and through lane
- Gautrans has approved the design for the future upgrades on 6th Road and R114 intersection (Intersection 5) that was undertaken by the WSP Consulting Engineers. The environmental authorisation is currently underway and is expected to be constructed within the next five (5) years.
- It is proposed that access road to the site be upgraded as follows:
 - The road pavement is to be surfaced and layer-works designed to accommodate heavy vehicle's (car carriers)
- It is proposed that 2,0 m wide paved sidewalk be provided along the site frontage which will ease and formalise the movement of pedestrians between the site access and public transport facilities.
- The site will be able accommodate 1812 parking bays. The parking bays will be 90 degrees, having dimensions of 5,0 m long by 2,5 m wide and a minimum aisle width of 7,5 m. This is in line with the DOT (1995) parking standards. Safe pedestrian crossings and walkways should



be provided to direct pedestrians between pedestrian accesses, parking areas and the buildings.

- A vehicle manoeuvring assessment was undertaken for the development site using the Auto-TURN software. A heavy vehicle and an emergency vehicle (fire truck) were simulated and the results illustrate that these vehicles can be accommodated at the site accesses and circulate within the site.

Based on the above, the proposed Motor Dealership on Portion 168 and 59 of the Farm Bulfontein 533-JQ will not have any negative impact on the immediate and surrounding road network and can be approved from a traffic engineering point of view.



14 References

1. Guidelines for the Geometric Design of Commercial and Industrial Local Streets, Urban Transport Guidelines 10 (UTG 10), Pretoria, South Africa, 1990.
2. South African Parking Standards, 2nd Edition, Department of Transport (DOT), November 1985.
3. TMH 16 Volume 2, South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual, Version 1.0, Committee of Transport Officials (COTO) August 2012.
4. TMH 17 Volume 1, South African Trip Data Manual, Version 1.01, Committee of Transport Officials (COTO) September 2013.



Figures

| | |
|-----------|--|
| Figure 1a | Locality Plan |
| Figure 1b | Locality Plan |
| Figure 2 | 2019 Weekday Peak Hour Traffic Volumes |
| Figure 3 | 2024 Weekday Peak Hour Traffic Volumes |
| Figure 4 | Expected Development Trip Distribution |
| Figure 5 | Expected Development Trip Assignment |
| Figure 6 | 2024 Background Plus Development Generated Peak Hour Traffic Volumes |



Project: C339-011118
**PROPOSED MOTOR DEALERSHIP ON
 PTN 168 & 59 BULTFONTEIN 533-JQ**

Figure Discription:
LOCALITY PLAN

1a



CHRISEN CONSULTING
TRAFFIC, TRANSPORTATION AND CIVIL ENGINEERING

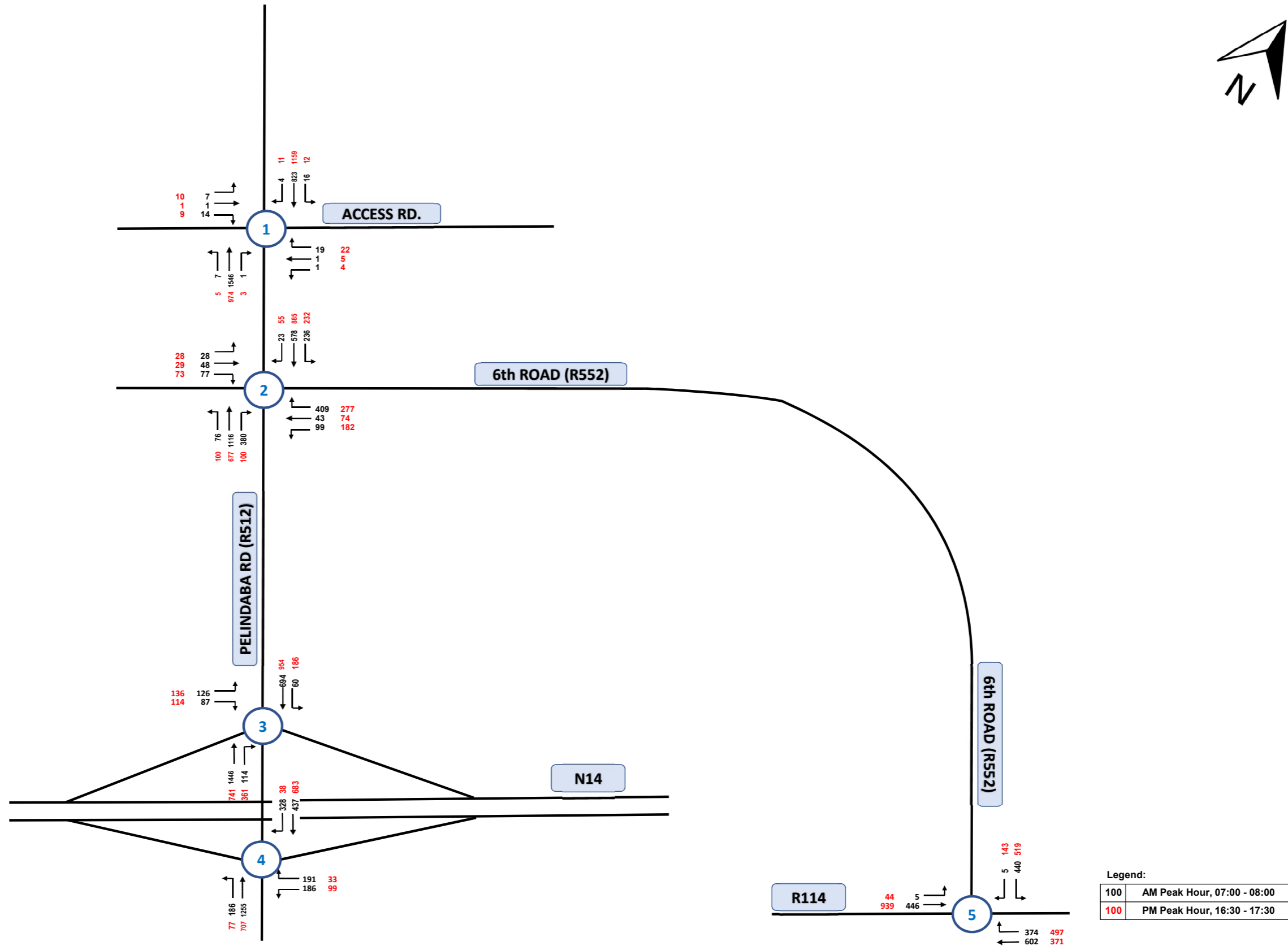
Project: C339-011118

**PROPOSED MOTOR DEALERSHIP ON
PTN 168 & 59 BULTFONTEIN 533-JQ**

Figure Discription:

LOCALITY PLAN

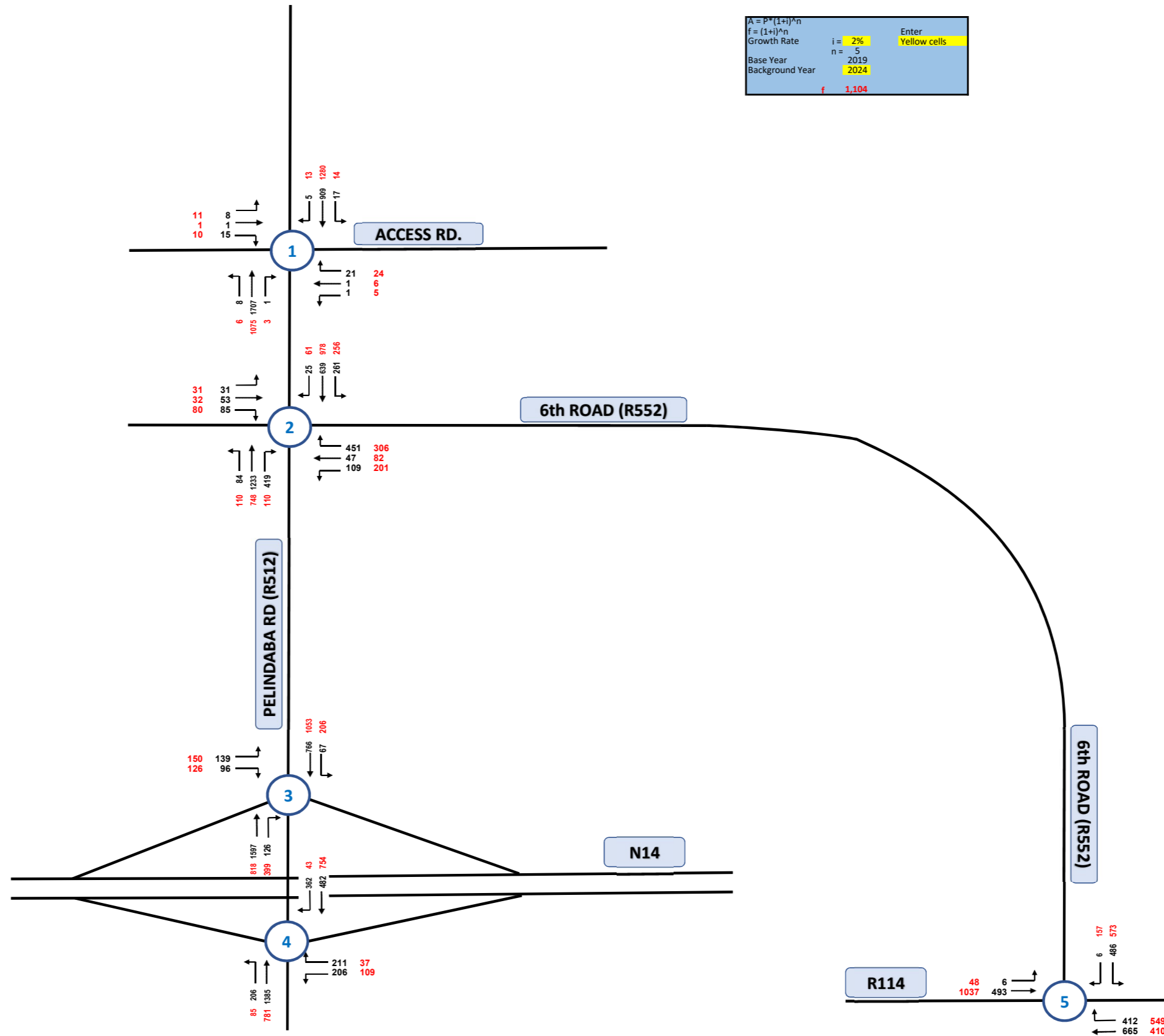
1b



Legend:

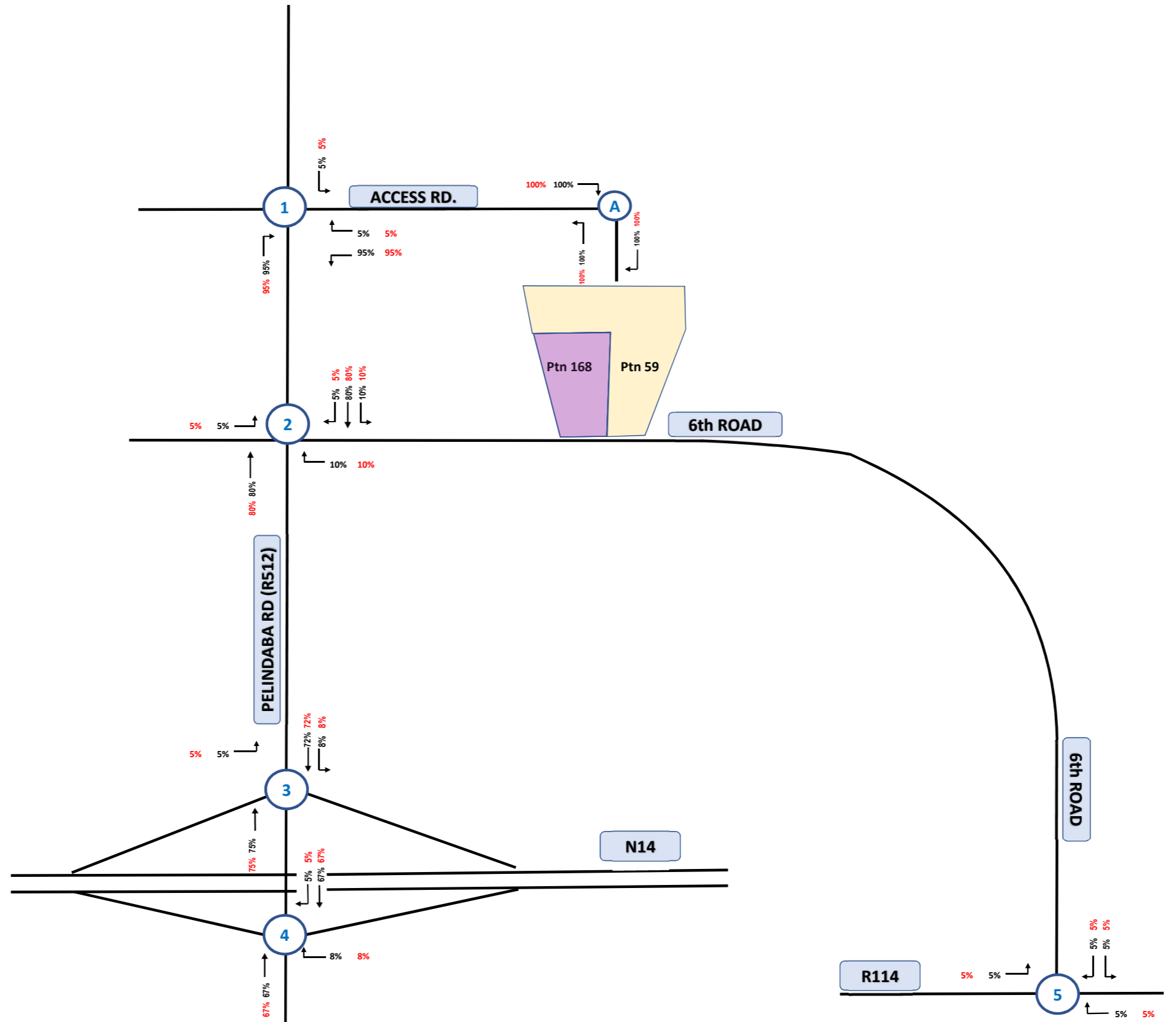
| | |
|-----|-----------------------------|
| 100 | AM Peak Hour, 07:00 - 08:00 |
| 100 | PM Peak Hour, 16:30 - 17:30 |

$A = P \cdot (1+i)^n$
 $f = (1+i)^n$
 Growth Rate $i = 2\%$ Enter
 Base Year $n = 5$ Yellow cells
 Background Year 2024
 $f = 1,104$



Legend:

| | |
|-----|-----------------------------|
| 100 | AM Peak Hour, 07:00 - 08:00 |
| 100 | PM Peak Hour, 16:30 - 17:30 |

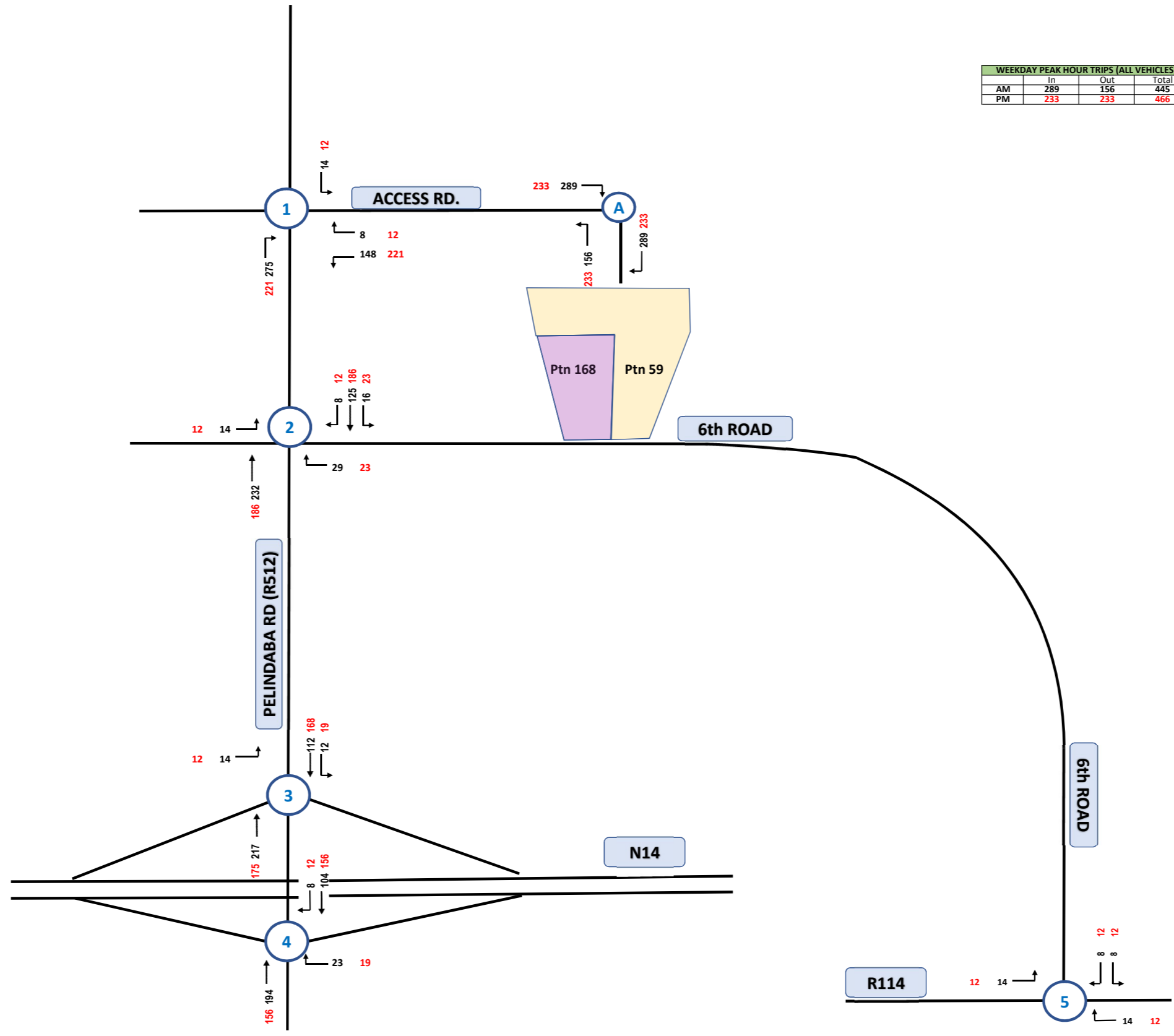


Legend:

| | |
|------|-----------------------------|
| 100% | AM Peak Hour, 07:00 - 08:00 |
| 100% | PM Peak Hour, 16:30 - 17:30 |



| WEEKDAY PEAK HOUR TRIPS (ALL VEHICLES) | | | |
|--|-----|-----|-------|
| | In | Out | Total |
| AM | 289 | 156 | 445 |
| PM | 233 | 233 | 466 |

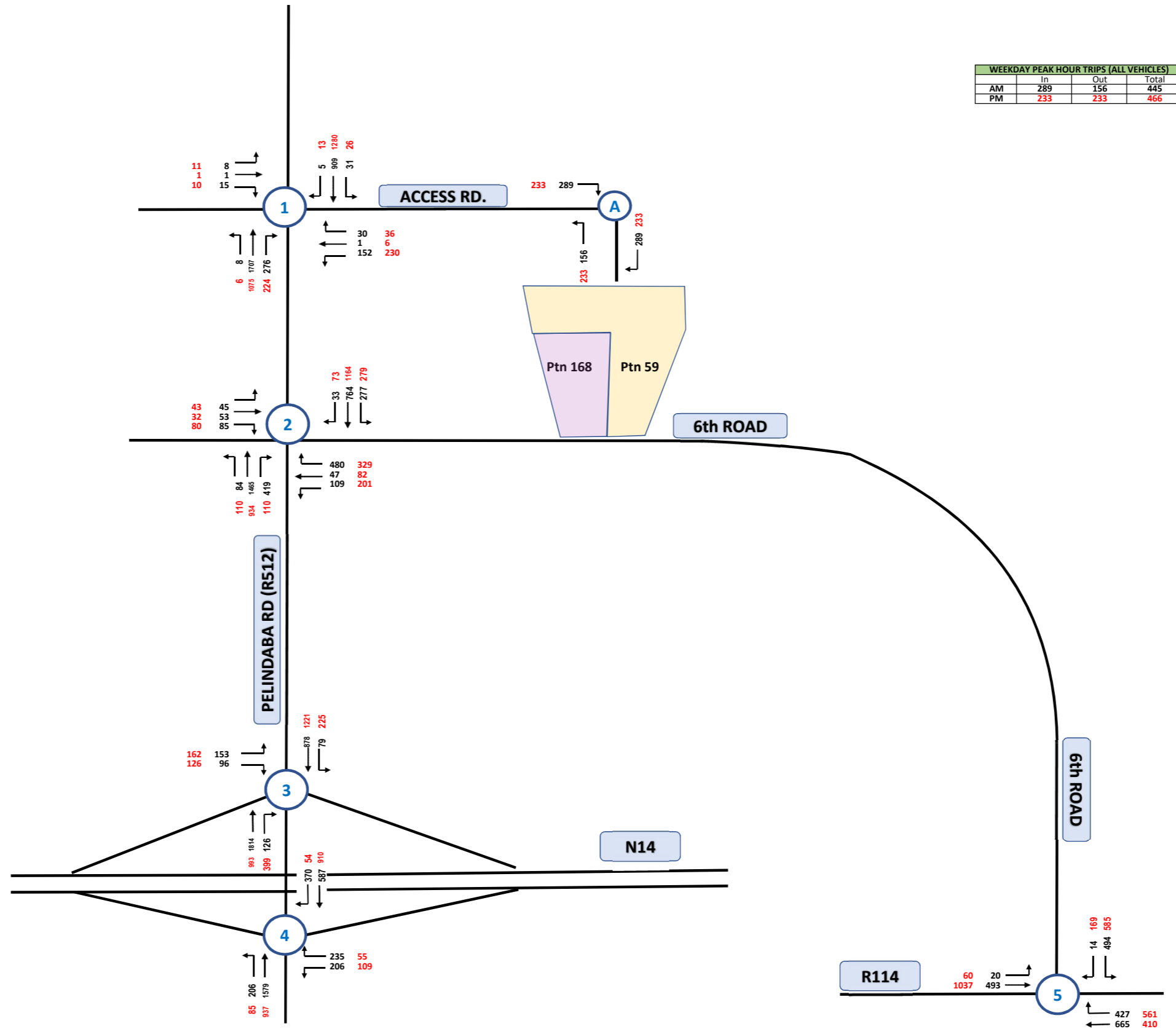


Legend:

| | |
|-----|-----------------------------|
| 100 | AM Peak Hour, 07:00 - 08:00 |
| 100 | PM Peak Hour, 16:30 - 17:30 |



| WEEKDAY PEAK HOUR TRIPS (ALL VEHICLES) | | | |
|--|-----|-----|-------|
| | In | Out | Total |
| AM | 289 | 156 | 445 |
| PM | 233 | 233 | 466 |





Drawings

- Drawing SKC001 General Layout Plan – Option 1
- Drawing SKC002 General Layout Plan – Option 2



Appendices



Appendix A

- Site Plan
- Surveyor General Diagram
- Zoning Approval



KEY NOTE DESCRIPTION

- All work is to be done in accordance with the National Building Regulations.
- All materials and workmanship are to comply with the relevant S.A.S. codes and/or the specified international codes where applicable in the Architectural specifications. Where relevant South African National Standards, British Standards, BS codes of practice, or Agreement Certificates applicable to the design exist, the recommendations and requirements of such documents to be considered a minimum standard for the works.
- The contractor shall at all aspects of the works comply with the provisions of the Occupational Health and Safety Act, 1993 (Act No. 95 of 1993) and any regulations promulgated in terms of that Act or the Factories Machinery and Building Works Act of 1941.
- The contractor shall set up, document and maintain a quality assurance and quality control system, in accordance with SANS 5001:2009, able to be checked to the satisfaction of the Architect. That all materials and workmanship, whatever their sources, meet the requirements of the Specifications. Should the Contractor or any of his sub-contractors be certified to the SANS 9000 family of standards then monitor these works accordingly.
- This drawing must be read in conjunction with all the relevant drawings, schedules and specifications from D1-P and all other consultants related to the project.
- All portions of the works related to any service or consultant's information is to be done in accordance with the National Building Regulations and any other applicable laws.
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- All work to be completed by competent persons qualified for the specific trade.
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REVISIONS

| REV | DATE | DRAWN | DESCRIPTION |
|-----|------------|-------|--|
| A | 2018-02-29 | ZB | PARKING ASBLE WIDTH INCREASED TO 1.5m |
| B | 2018-04-26 | ZB | 5 BAYE LOST |
| C | 2018-04-26 | ZB | PRINCIPAL ELEVATIONS OF MAIN BUILDINGS ADDED |
| D9 | 2018-10-01 | ZB | PROPOSED NEW SITE FOR HINO |
| 1 | 2018-10-28 | ZB | SITE SURVEY MISTAKE INCLUDED |

KEY PLAN

| DISCIPLINE | AREA | COVERAGE | DATE | STATUS |
|-------------|------|----------|------|--------|
| GENERAL | Area | 100% | 2018 | Final |
| Structural | Area | 100% | 2018 | Final |
| Mechanical | Area | 100% | 2018 | Final |
| Electrical | Area | 100% | 2018 | Final |
| Water | Area | 100% | 2018 | Final |
| Sanitary | Area | 100% | 2018 | Final |
| Fire | Area | 100% | 2018 | Final |
| Security | Area | 100% | 2018 | Final |
| Landscaping | Area | 100% | 2018 | Final |
| Site | Area | 100% | 2018 | Final |
| Survey | Area | 100% | 2018 | Final |

CLIENT

| DISCIPLINE | AREA | COVERAGE | DATE | STATUS |
|-------------|------|----------|------|--------|
| GENERAL | Area | 100% | 2018 | Final |
| Structural | Area | 100% | 2018 | Final |
| Mechanical | Area | 100% | 2018 | Final |
| Electrical | Area | 100% | 2018 | Final |
| Water | Area | 100% | 2018 | Final |
| Sanitary | Area | 100% | 2018 | Final |
| Fire | Area | 100% | 2018 | Final |
| Security | Area | 100% | 2018 | Final |
| Landscaping | Area | 100% | 2018 | Final |
| Site | Area | 100% | 2018 | Final |
| Survey | Area | 100% | 2018 | Final |

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CAPETOWN
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NEWCASTLE
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CLIENT

HALFWAY HINO & TOYOTA LANSERIA

HALFWAY GROUP OF COMPANIES

ON PORTION 168 & 159 BULTFOUNTAIN NO. 533

JOHANNESBURG

CONCEPT LAYOUT

SCALE: 1:500 @ A0

PROJECT: AARN01 01 DISCIPLINE: AR BLOCK / SERIES / SUFFIX: 1001-SK12.1 REVISION: -

DRAWN BY: CHECKED BY:



KEY NOTE

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| REV | DATE | DRAWN | DESCRIPTION |
|-----|------------|-------|--|
| A | 2018-02-29 | ZB | PARKING ASBLE WIDTH INCREASED TO 1.5m |
| B | 2018-04-26 | ZB | 5 BAYE LOST |
| | 2018-04-26 | ZB | PRINCIPAL ELEVATIONS OF MAIN BUILDINGS ADDED |
| D01 | 2018-10-01 | ZB | PROPOSED NEW SITE FOR HINO |
| 1 | 2018-10-28 | ZB | SITE SURVEY MISTAK INCLUDED |

KEY PLAN

| DISCIPLINE | AREA | COVERAGE | DATE | STATUS |
|---------------|------|----------|------|--------|
| GROUNDWORK | Area | 100% | 2018 | Final |
| Structural | Area | 100% | 2018 | Final |
| MEP | Area | 100% | 2018 | Final |
| ENVIRONMENTAL | Area | 100% | 2018 | Final |
| LANDSCAPE | Area | 100% | 2018 | Final |
| TRAFFIC | Area | 100% | 2018 | Final |
| UTILITIES | Area | 100% | 2018 | Final |
| WATER | Area | 100% | 2018 | Final |
| SEWER | Area | 100% | 2018 | Final |
| RAINWATER | Area | 100% | 2018 | Final |
| TELECOMS | Area | 100% | 2018 | Final |
| POWER | Area | 100% | 2018 | Final |
| TELEVISION | Area | 100% | 2018 | Final |
| INTERNET | Area | 100% | 2018 | Final |
| MOBILE | Area | 100% | 2018 | Final |
| FIXED | Area | 100% | 2018 | Final |
| WIRELESS | Area | 100% | 2018 | Final |
| WIRE | Area | 100% | 2018 | Final |
| NON-WIRE | Area | 100% | 2018 | Final |
| WIRELESS | Area | 100% | 2018 | Final |
| WIRE | Area | 100% | 2018 | Final |
| NON-WIRE | Area | 100% | 2018 | Final |

CLIENT

| DISCIPLINE | AREA | COVERAGE | DATE | STATUS |
|---------------|------|----------|------|--------|
| GROUNDWORK | Area | 100% | 2018 | Final |
| Structural | Area | 100% | 2018 | Final |
| MEP | Area | 100% | 2018 | Final |
| ENVIRONMENTAL | Area | 100% | 2018 | Final |
| LANDSCAPE | Area | 100% | 2018 | Final |
| TRAFFIC | Area | 100% | 2018 | Final |
| UTILITIES | Area | 100% | 2018 | Final |
| WATER | Area | 100% | 2018 | Final |
| SEWER | Area | 100% | 2018 | Final |
| RAINWATER | Area | 100% | 2018 | Final |
| TELECOMS | Area | 100% | 2018 | Final |
| POWER | Area | 100% | 2018 | Final |
| TELEVISION | Area | 100% | 2018 | Final |
| INTERNET | Area | 100% | 2018 | Final |
| MOBILE | Area | 100% | 2018 | Final |
| FIXED | Area | 100% | 2018 | Final |
| WIRELESS | Area | 100% | 2018 | Final |
| WIRE | Area | 100% | 2018 | Final |
| NON-WIRE | Area | 100% | 2018 | Final |
| WIRELESS | Area | 100% | 2018 | Final |
| WIRE | Area | 100% | 2018 | Final |
| NON-WIRE | Area | 100% | 2018 | Final |

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HALFWAY HINO & TOYOTA LANSERIA

HALFWAY GROUP OF COMPANIES

ON
PORTION 168 & 159
BULTFOUNTAIN NO. 533

JOHANNESBURG

CONCEPT LAYOUT

SCALE: 1:500 @ A0

PROJECT: AARN01 01 DISCIPLINE: AR BLOCK / SERIES / SUFFIX: 1001-SK12 REVISION: -

DRAWN BY: CHECKED BY:

GENERAL REVISIONS KEY PLAN CLIENT PROJECT TITLE



Appendix B

- B-1: Johannesburg RISFSA Region A Road Hierarchy
- B-2: Gauteng Strategic Road Network Planning



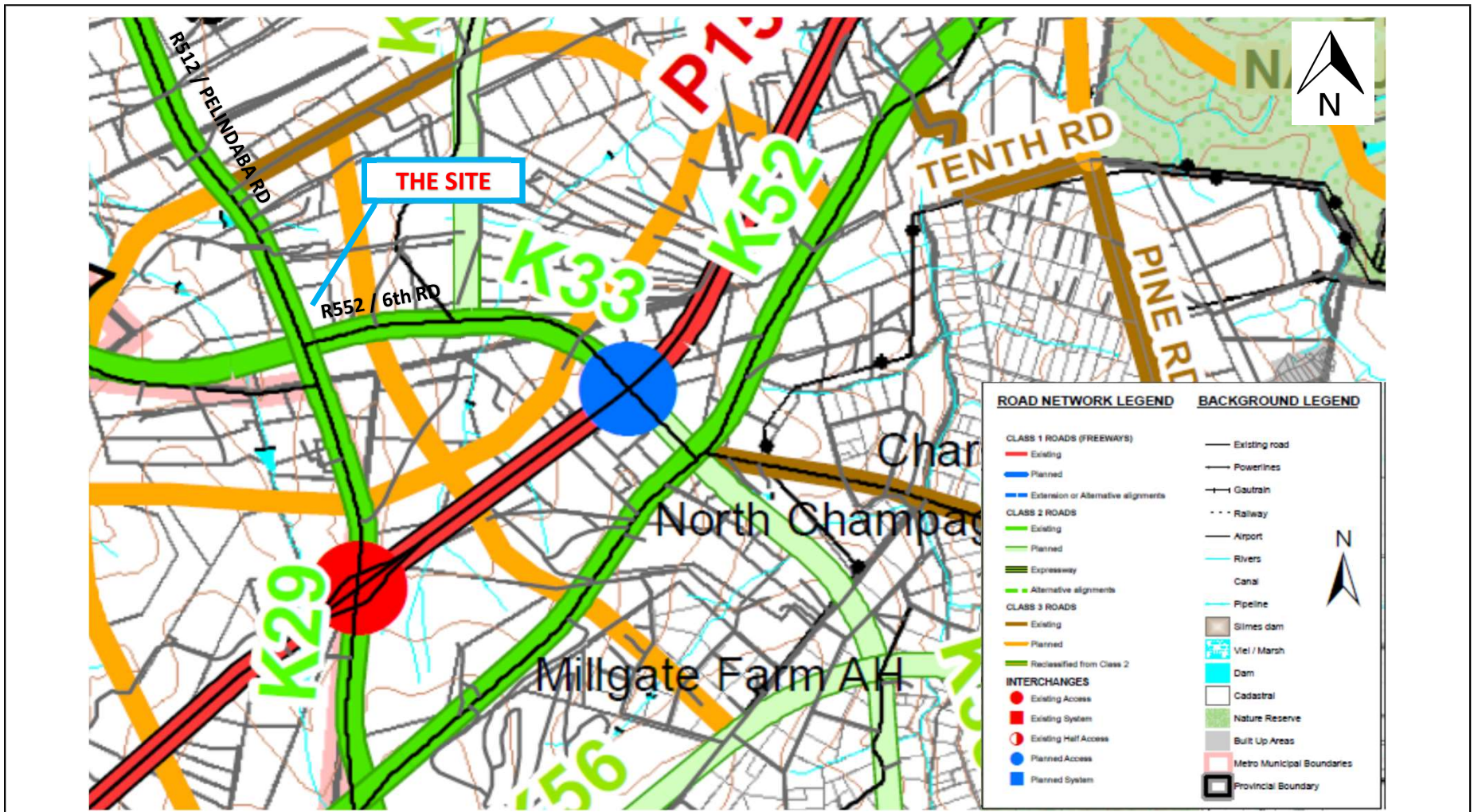
CHRISEN CONSULTING
TRAFFIC, TRANSPORTATION AND CIVIL ENGINEERING

Project: C154-061017
PROPOSED MOTOR DEALERSHIP ON
PORTION 168, BULFONTEIN 533-JQ

Figure Discription:

JOHANNESBURG RISFSA REGION A ROAD HIERARCHY

B-1





Appendix C

- Trip Generation Calculations

Project No.: C339-011118

Proposed Motor Dealership on Ptn 168 & 59 Bulfontein 533-JQ

Date: 2019/02/20 15:19

Author: Christopher E Nair

DEVELOPMENT TRIP GENERATION TABLE



| Trip Code | Land Use | Development | Size (m ²) | Unit of Measurement | | COTO Peak Hour Base Trip Generation Rates (veh/h) | | | | | | | | | | Total Expected Peak Hour Trip Generation (Veh/h) | | | | | | | | |
|-----------|------------------|------------------|------------------------|---------------------|-----------------------|---|-------|-----|-----------|-------|-----|----------|-------|-----|---------|--|-------|-------------|-----|-------|----------|-----|-------|--|
| | | | | | | AM PEAK | SPLIT | | FRIDAY PM | SPLIT | | SATURDAY | SPLIT | | AM PEAK | | | FRIDAY (PM) | | | SATURDAY | | | |
| | | | | | | | IN | OUT | | IN | OUT | | IN | OUT | In | Out | TOTAL | In | Out | TOTAL | In | Out | TOTAL | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| 841 | Motor Dealership | Motor Dealership | 20244,00 | 202 | 100m ² GLA | 2,20 | 65% | 35% | 2,30 | 50% | 50% | 2,20 | 45% | 55% | 289 | 156 | 445 | 233 | 233 | 466 | 200 | 245 | 445 | |



Appendix D

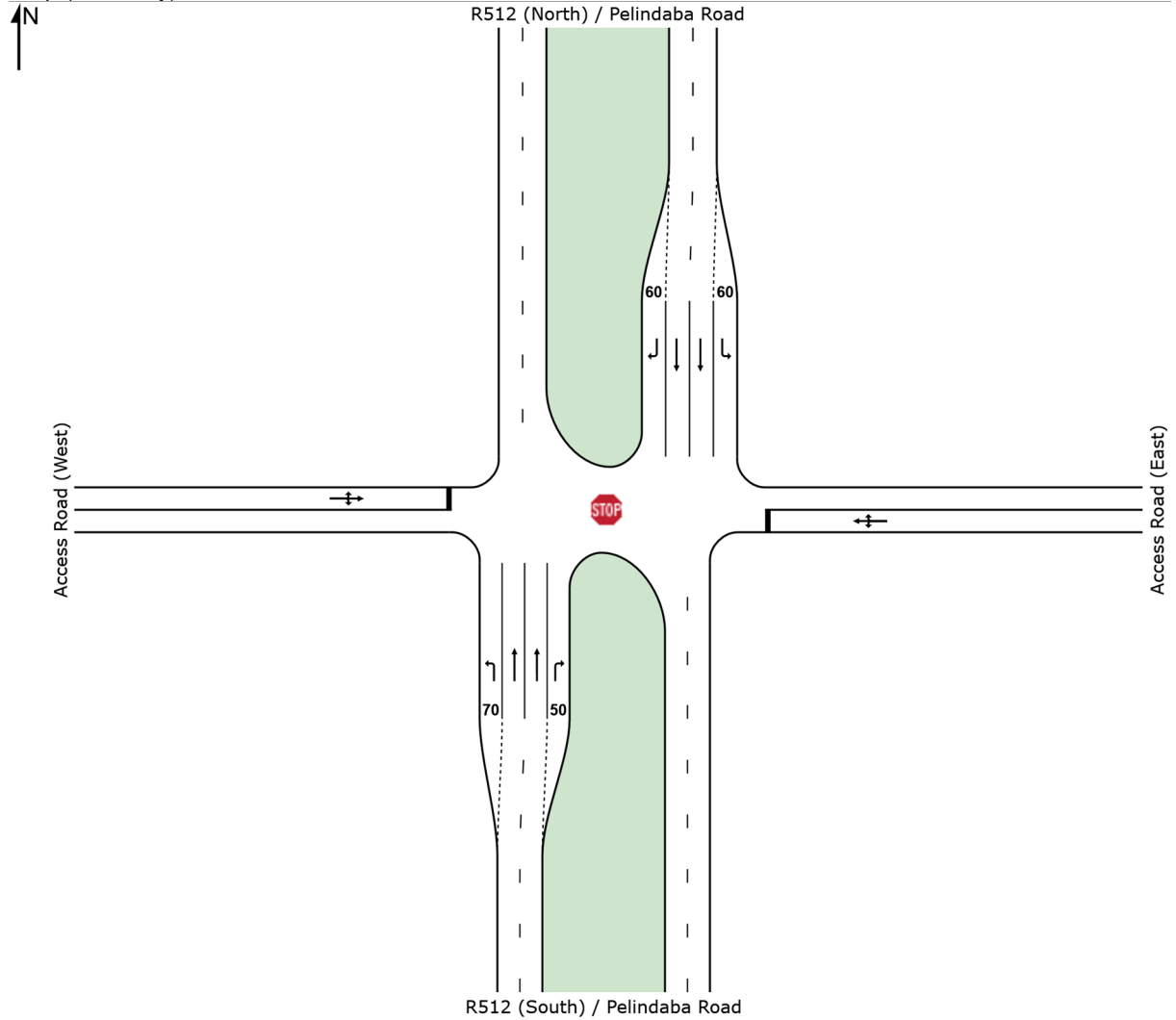
- SIDRA Intersection Layouts

EXISTING INTERSECTION LAYOUTS

PELINDABA ROAD / ACCESS ROAD (INTERECTION 1)

 Site: 1v [2017 AM Peak Hour]

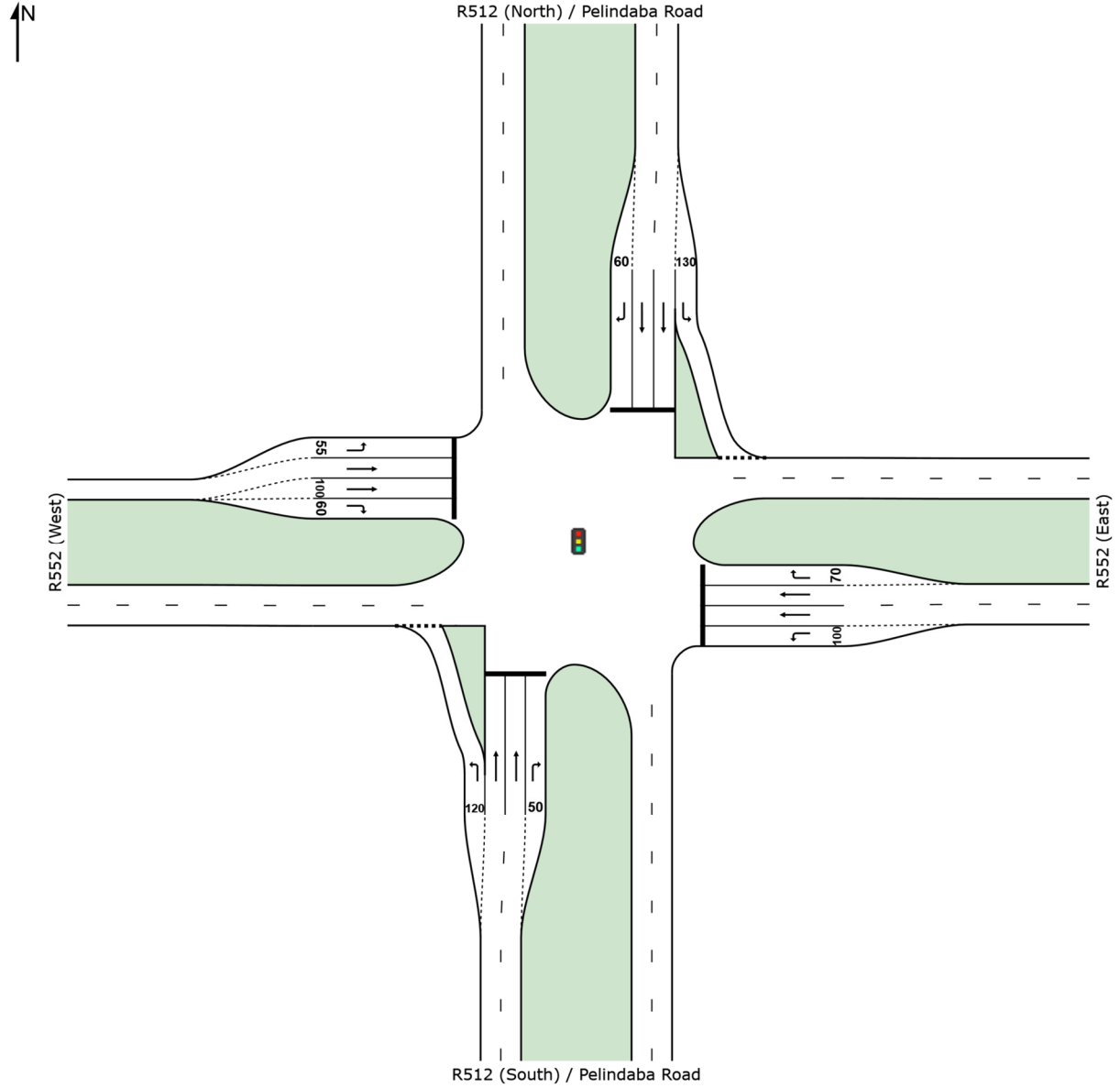
1. R512 and Access Road - 2017 AM Peak Hour
Stop (Two-Way)



PELINDABA ROAD / 6TH ROAD (INTERECTION 2)

 Site: 1vv [2017 AM Peak Hour]

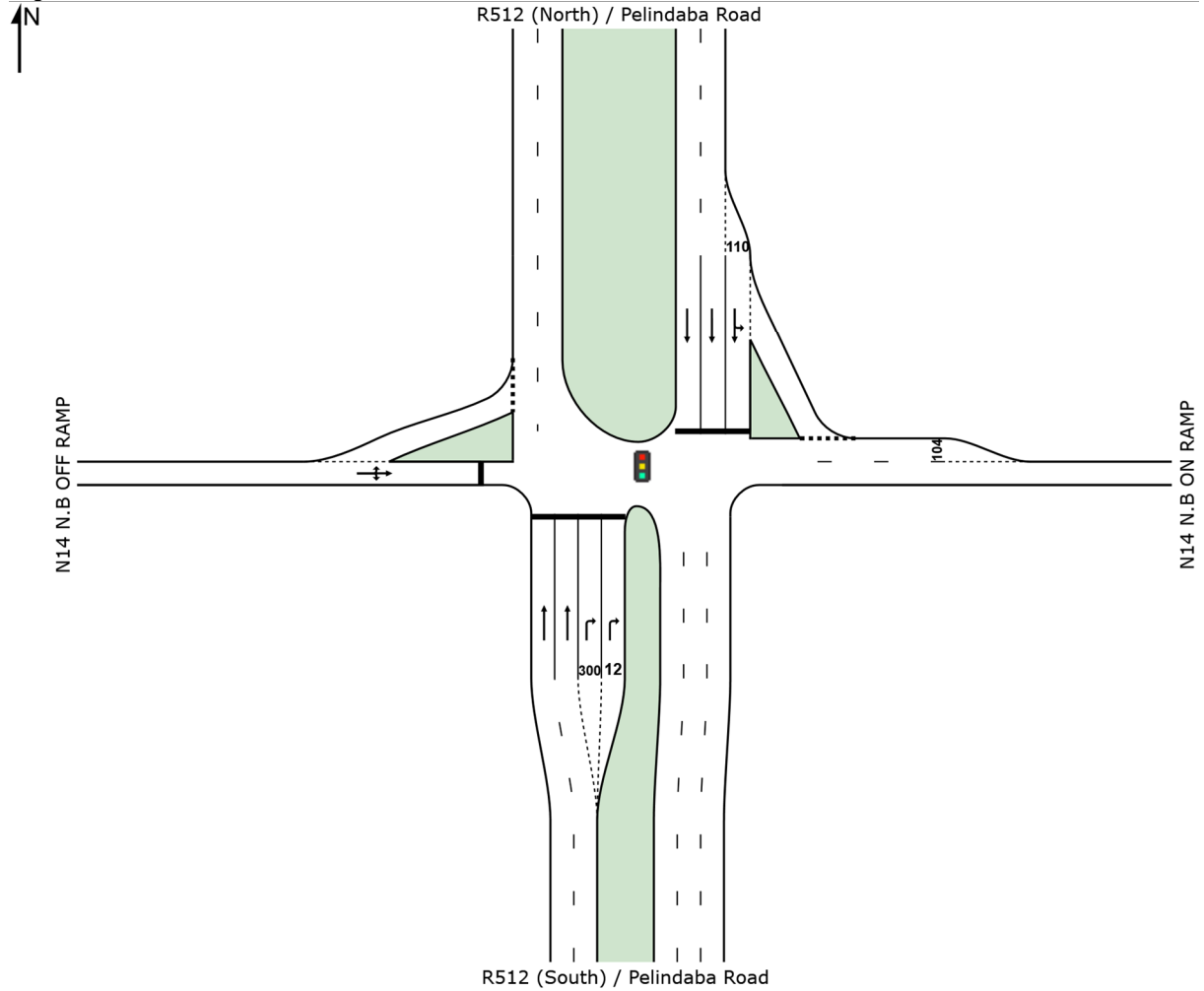
1. R512 and R552 - 2017 AM Peak Hour
Signals - Fixed Time Isolated



PELINDABA ROAD / N14 N.B (INTERECTION 3)

 Site: 3 [2017 AM Peak Hour]

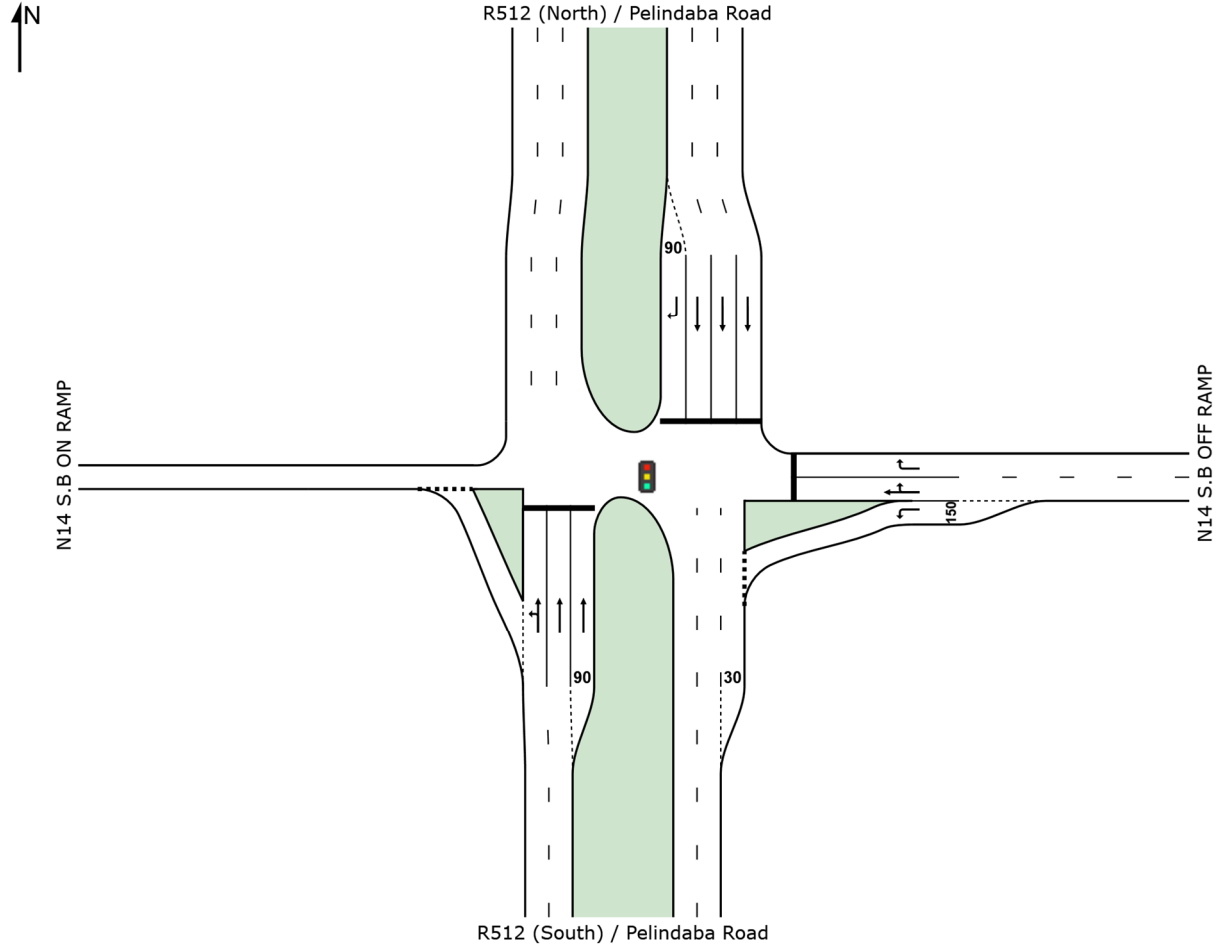
1. R512 and N14 N.B - 2017 AM Peak Hour
Signals - Fixed Time Isolated



PELINDABA ROAD / N14 S.B (INTERECTION 4)

 Site: 4 [2017 AM Peak Hour]

4. R512 and N14 S.B - 2017 AM Peak Hour
Signals - Fixed Time Isolated

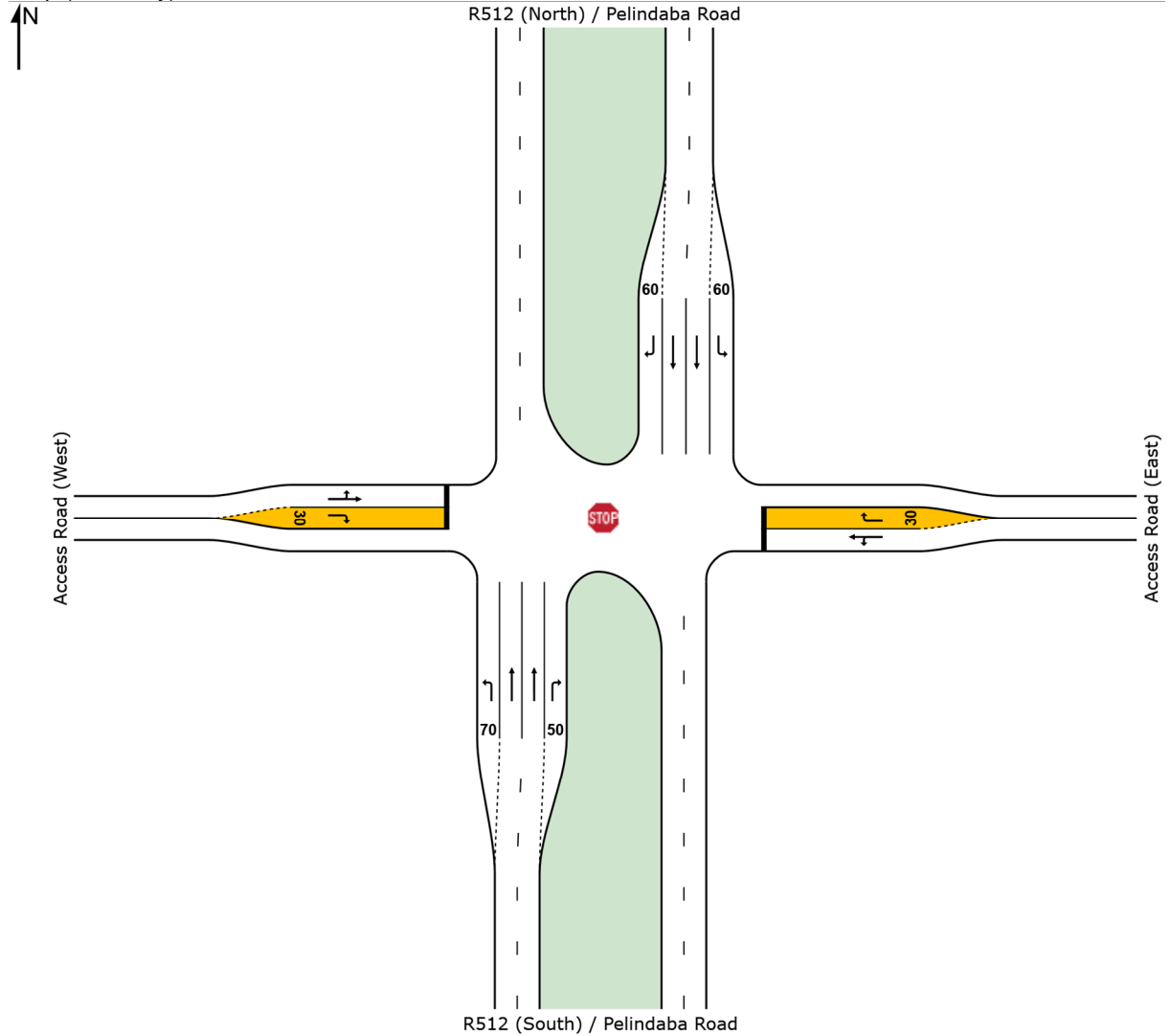


UPGRADED INTERSECTION LAYOUTS

PELINDABA ROAD / ACCESS ROAD (INTERECTION 1)

 Site: 1v [2024 Background Plus Dev. Gen_AM Peak Hour - UPGRADE]

1. R512 and Access Road - 2022 Background Plus Dev. Gen_AM Peak Hour - UPGRADE
Stop (Two-Way)





AutoJ

Pelindaba Road (R512) & Access Road
Portion 168, Bulfontein 533-JQ

Xwe

Stop street on west and east approaches

Volume (evu/hr)

| | | from North | | | | |
|----|-----|------------|------|-------|-------|-------|
| | | peds | left | str | right | L+S+R |
| AM | off | | 31 | 909 | 5 | 945 |
| PM | | | 26 | 1 280 | 13 | 1 319 |

| | | from South | | | | |
|--|--|------------|------|-------|-------|-------|
| | | peds | left | str | right | L+S+R |
| | | | 8 | 1 707 | 276 | 1 991 |
| | | | 6 | 1 075 | 224 | 1 305 |

| | | from West | | | | |
|--|--|-----------|------|-----|-------|-------|
| | | peds | left | str | right | L+S+R |
| | | | 8 | 1 | 15 | 24 |
| | | | 11 | 1 | 10 | 22 |

| | | from East | | | | |
|--|--|-----------|------|-----|-------|-------|
| | | peds | left | str | right | L+S+R |
| | | | 152 | 1 | 30 | 183 |
| | | | 230 | 6 | 36 | 272 |

| | | intersection | |
|--|--|--------------|-------|
| | | | total |
| | | | 3 143 |
| | | | 2 918 |

Lanes (if lanes shared L:S or S:R = 0.5:0.5; L:S:R = 0.3:0.4:0.3)

| # lanes | L~ | L | S | R |
|---------|----|---|---|---|
| | | 1 | 2 | 1 |

| # lanes | L~ | L | S | R |
|---------|----|---|---|---|
| | | 1 | 2 | 1 |

| # lanes | L~ | L | S | R |
|---------|----|-----|-----|---|
| | | 0,5 | 0,5 | 1 |

| # lanes | L~ | L | S | R |
|---------|----|-----|-----|---|
| | | 0,5 | 0,5 | 1 |

Control

| | | from North | | | |
|--|--|------------|------|-----|-------|
| | | peds | left | str | right |
| | | | | | |

| | | from South | | | |
|--|--|------------|------|-----|-------|
| | | peds | left | str | right |
| | | | | | |

| | | from West | | | |
|--|--|-----------|------|------|-------|
| | | peds | left | str | right |
| | | | | | |
| | | stop | stop | stop | stop |

| | | from East | | | |
|--|--|-----------|------|------|-------|
| | | peds | left | str | right |
| | | | | | |
| | | stop | stop | stop | stop |

VOLUME to CAPACITY (V/C)

| | | V/C from North | | | | |
|----|-----|----------------|------|------|-------|-------|
| | | peds | left | str | right | L+S+R |
| AM | off | | 0,02 | 0,23 | 0,02 | 0,22 |
| PM | | | 0,01 | 0,32 | 0,02 | 0,31 |

| | | A-B | C-D | E | F | |
|--|--|----------------|------|------|-------|-------|
| | | V/C from South | | | | |
| | | peds | left | str | right | L+S+R |
| | | | 0,00 | 0,42 | 0,43 | 0,42 |
| | | | 0,00 | 0,27 | 0,53 | 0,31 |

LOS A<0.5, B<0.8, C<0.9, D<0.95, E<0.99

| | | V/C from West | | | | |
|--|--|---------------|------|------|-------|-------|
| | | peds | left | str | right | L+S+R |
| | | | 0,04 | 0,07 | 0,63 | 0,41 |
| | | | 0,03 | 0,06 | 0 | 0,11 |

Ped LOS A<0.1, B<0.3, C<0.4, D<0.6, E<0.97, F=0.97+

| | | V/C from East | | | | V/C | | |
|--|--|---------------|------|------|-------|-------|------|---------|
| | | peds | left | str | right | L+S+R | max | overall |
| | | | 0,27 | 0,54 | 0,68 | 0,34 | 0,68 | 0,36 |
| | | | 0,56 | 1,10 | 0,78 | 0,60 | 1,1 | 0,33 |

Average DELAY per vehicle (secs)

| | | delay from North | | | | |
|----|-----|------------------|------|-----|-------|-------|
| | | peds | left | str | right | L+S+R |
| AM | off | | 0 | 1 | 0 | 1 |
| PM | | | 0 | 2 | 0 | 2 |

| | | A-B | C-D | E | F | |
|--|--|------------------|------|-----|-------|-------|
| | | delay from South | | | | |
| | | peds | left | str | right | L+S+R |
| | | | 0 | 3 | 3 | 3 |
| | | | 0 | 1 | 4 | 2 |

LOS A<10, B<15, C<25, D<35, E<50

| | | delay from West | | | | |
|--|--|-----------------|------|-----|-------|-------|
| | | peds | left | str | right | L+S+R |
| | | | 8 | 9 | 14 | 12 |
| | | | 8 | 9 | 9 | 9 |

Ped LOS A<10, B<15, C<25, D<35, E<50, F=50+

| | | delay from East | | | | delay / veh | | |
|--|--|-----------------|------|-----|-------|-------------|-----|---------|
| | | peds | left | str | right | L+S+R | max | overall |
| | | | 10 | 14 | 16 | 11 | 16 | 3 |
| | | | 12 | 257 | 21 | 19 | 257 | 3 |

Average QUEUE length (veh) (= total delay veh-hrs / hr)

OK WARN POOR

| | | Q from North | | | | |
|----|-----|--------------|------|-----|-------|-------|
| | | peds | left | str | right | L+S+R |
| AM | off | | 0,0 | 0,3 | 0,0 | 0,3 |
| PM | | | 0,0 | 0,7 | 0,0 | 0,7 |

| | | Q from South | | | | |
|--|--|--------------|------|-----|-------|-------|
| | | peds | left | str | right | L+S+R |
| | | | 0,0 | 1,4 | 0,2 | 1,6 |
| | | | 0,0 | 0,4 | 0,2 | 0,7 |

Q <4 = OK, <10 = WARN, 10+ = POOR

| | | Q from West | | | | |
|--|--|-------------|------|-----|-------|-------|
| | | peds | left | str | right | L+S+R |
| | | | 0,0 | 0,0 | 0,1 | 0,1 |
| | | | 0,0 | 0,0 | 0,0 | 0,1 |

| | | Q from East | | | | Queue | | |
|--|--|-------------|------|-----|-------|-------|-----|-------|
| | | peds | left | str | right | L+S+R | max | total |
| | | | 0,4 | 0,0 | 0,1 | 0,5 | 1,4 | 2,5 |
| | | | 0,8 | 0,4 | 0,2 | 1,4 | 0,8 | 2,8 |