TRAFFIC IMPACT ASSESMENT

PROPOSED NEW RESIDENTIAL DEVELOPMENT, ERF 4784, STILL BAY

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LIST OF ABBREVIATIONS

TIA	Traffic Impact Assessment
WCG	Western Cape Government
AMG	Access Management Guidelines (2016)
RAG	Road Access Guidelines (2002)
LOS	Level of Service
DoT	Department of Transport
RDE	Roadside Development Environment
MR	Main Road
SDP	Site Development Plan
AMP	Access Management Plan
GLA	Gross Leasable Area
SATGRM	South African Trip Generation Rates Manual
DoT	Department of Transport

1 INTRODUCTION

Urban Engineering (Pty) Ltd was appointed by Ellenrust Properties to undertake a Traffic Impact Assessment for the proposed sub division and development of 270 residential dwelling units on Erf 4784 in Still Bay, Hessequa (refer to Figure 1-1 below for the locality plan).

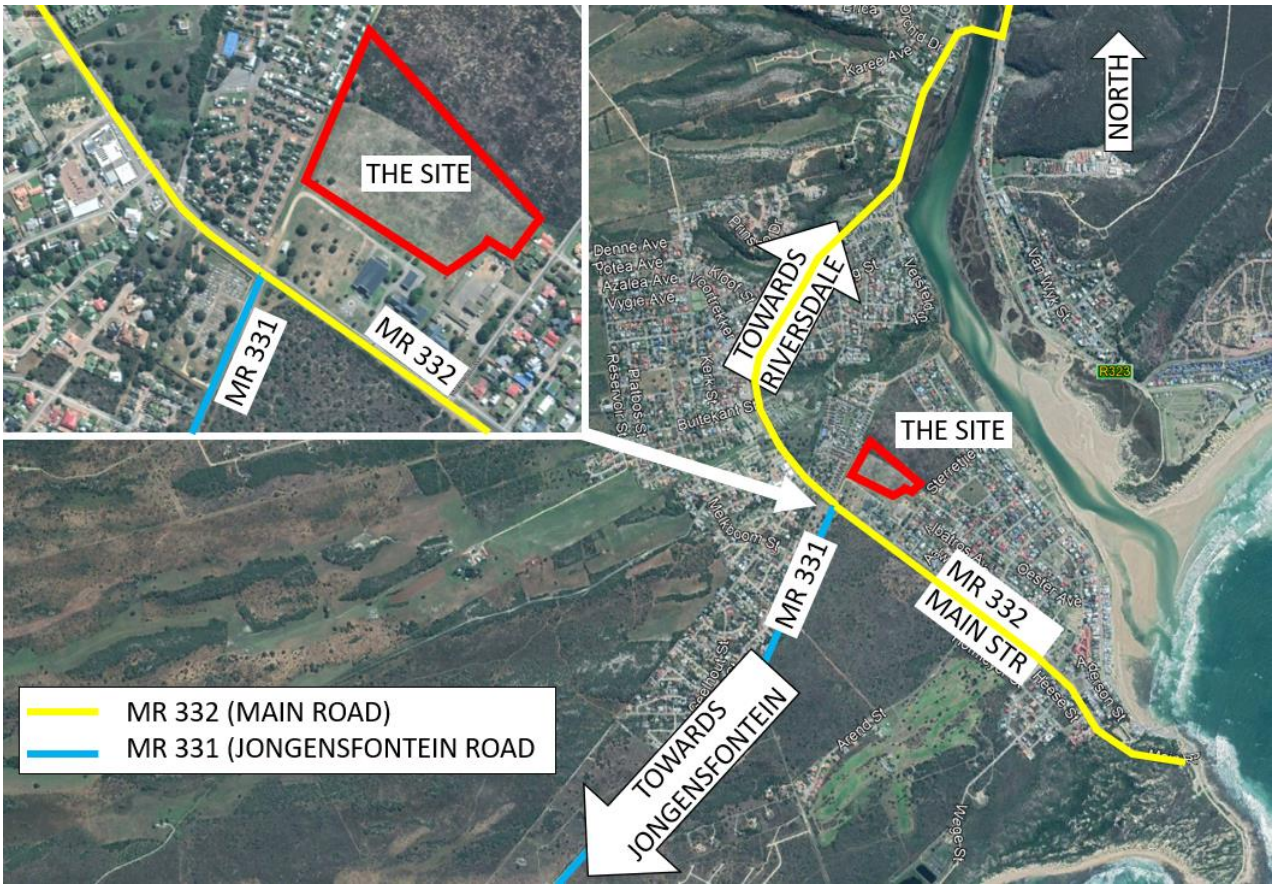


Figure 1-1 - Locality Plan

1.1 Objective of this report

The purpose of this TIA is to determine how the traffic, generated by the proposed development, will influence the road network within the immediate vicinity of the site. Based on a capacity analysis of certain intersections, recommendations will be made to ensure that the network will operate smoothly in peak traffic times.

The following methodology was used to perform this TIA:

i. Assess the traffic conditions on the existing road network

ii. Assess the traffic generation effects of the proposed development

iii. Superimpose (ii) on (i) and reassess traffic operations on the road network

iv. Assess the interface conditions between the road network and the proposed development

v. Highlight any traffic concerns resulting from the proposed development

vi. Make recommendations

2 SPATIAL DEVELOPMENT FRAMEWORK

Based on Hessequa Municipality's Spatial Development Framework (April 2017) erf 4784 falls within the Urban Edge boundary and has been identified as a residential area that should undergo densification (refer to Figure 2-1.) The relevant Still Bay SDF has been attached as **ANNEXURE A** to this report.

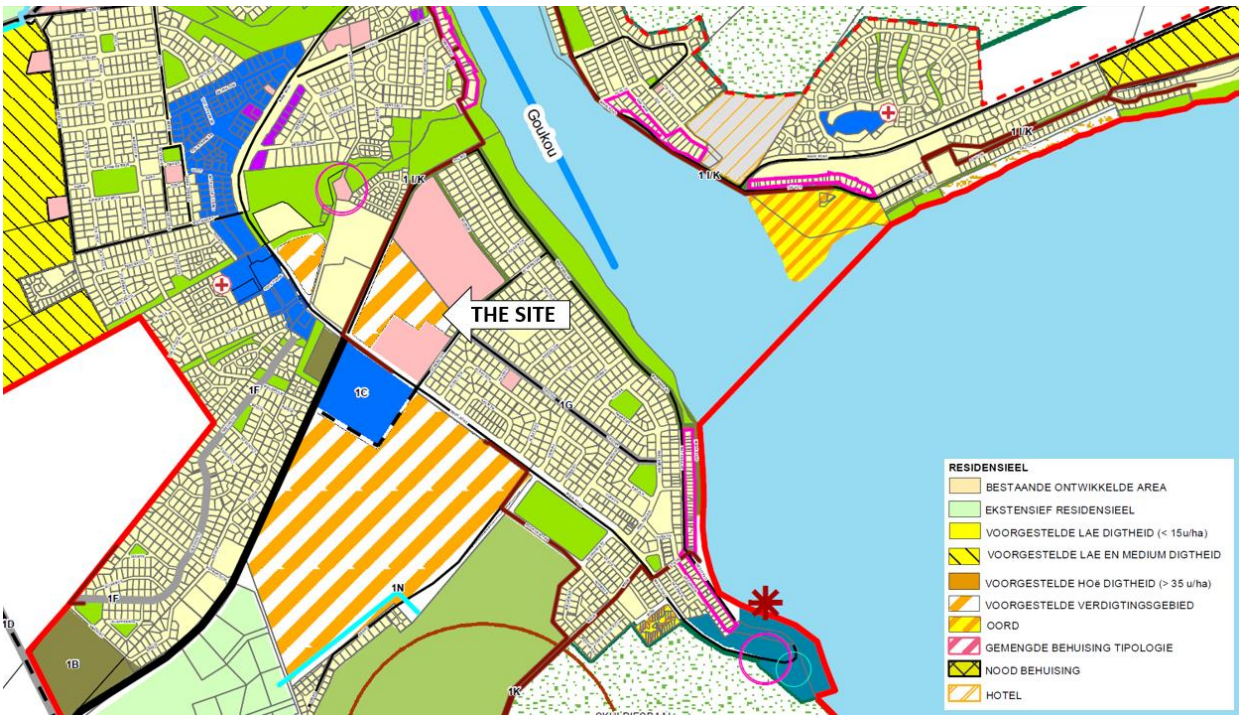


Figure 2-1 – Extract from Still Bay SDF

3 CURRENT LAND USE

The site is currently undeveloped and covered with grass and shrubbery. Access to the site is via an unsurfaced informal road that forms a four-legged junction with the intersection of MR331 and MR332 (Main Road).

Figure 3-1 - Site Access

4 THE PROPOSED DEVELOPMENT PARTICULARS

The proposed development consists of three distinct components namely:

Retirement Village – 120 units

Old-Age Home (Assisted Living) – 8 units

Nursing Home (32 beds)

According to the South African Trip Data Manual, TMH 17 Volume 1 (COTO, May 2018) these land uses are defined as follows:

251 Retirement Village

Dwelling Units intended for senior adults. Dwelling units could be either detached or provided in one building structure.

254 Old-Age Home

Providing living facilities and care for senior adults. They commonly have single rooms for residents and services include dining, housekeeping, care, medication, administration and transportation.

620 Nursing Home

A facility whose primary function is to care for persons who are unable to care for themselves. Care is mostly provided by nursing staff and by visiting doctors. Traffic is primarily generated by employees, deliveries and visitors and not by residents.

An extract of the proposed sub division plan has been attached as Figure 4-1 below, but the complete SDP has been included as **ANNEXURE B** to this report.

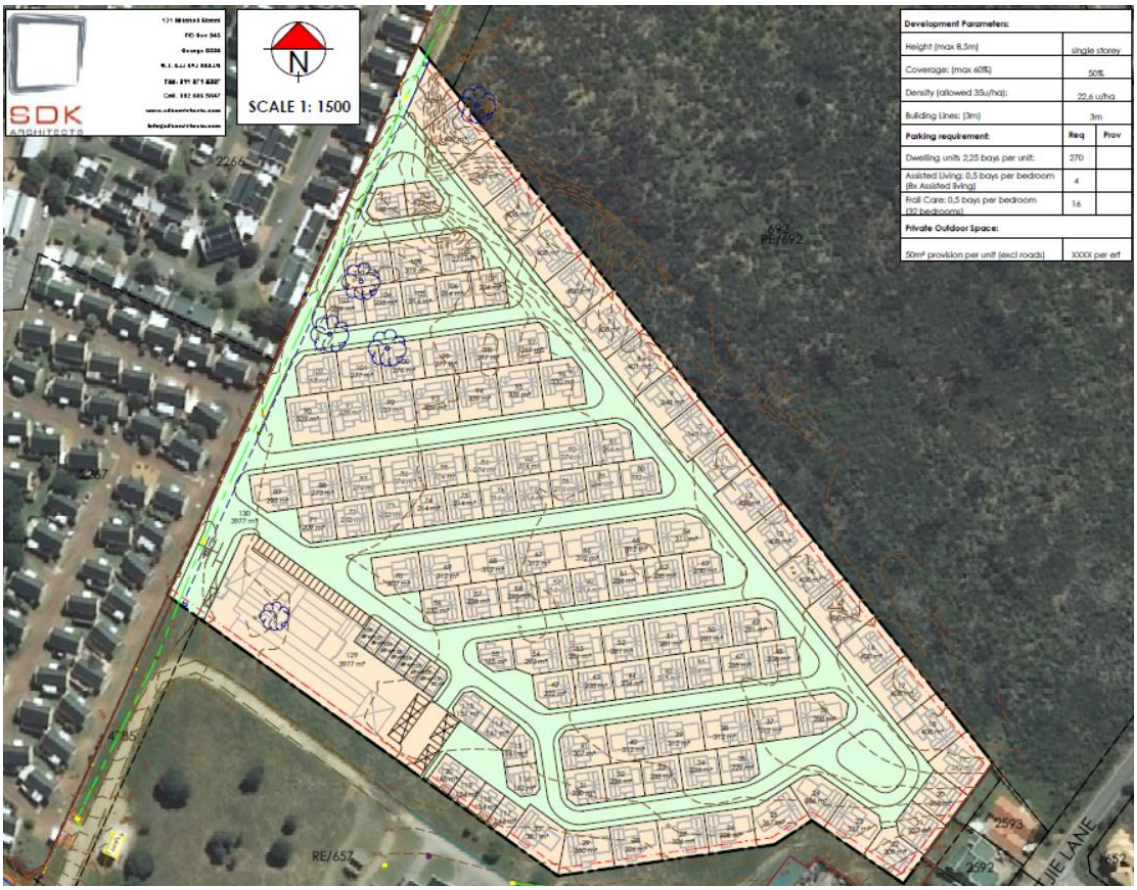


Figure 4-1 - Proposed Sub-Division Plan

5 THE PROPOSED WESTERN BYPASS

Hessequa Municipality has been planning the implementation of a new Western Bypass around Still Bay for quite some time. The purpose of this by-pass would be twofold:

1. Open up development potential to the Western areas of the town.
2. Act as a by-pass route for traffic in order to alleviate the pressure on the CBD Roads and residential roads to the west of the town.

In 2012 VelaVKE Consulting Engineers prepared a report (VKE1065.01.01 VelaVKE Engineers, 2012) specific to the proposed by-pass, and proposed the position of the by-pass as indicated schematically in Figure 5-1 below.

Figure 5-1 - Proposed Western By-Pass

The proposed road cross section as per the VKE report, has been included below:

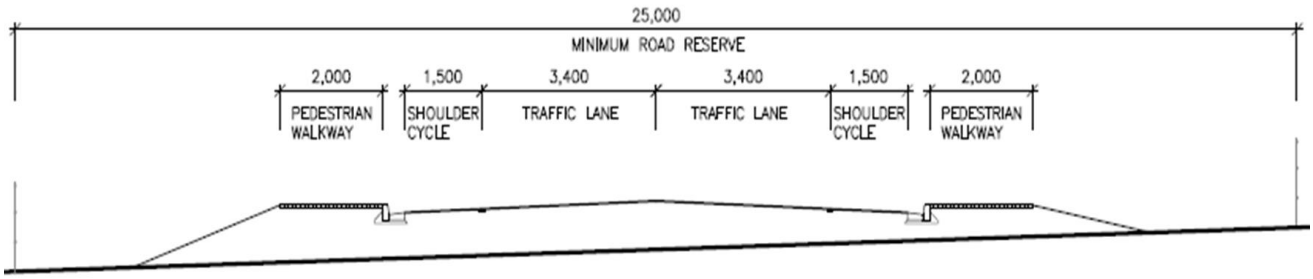


Figure 5-2 - Proposed Western Arterial Typical Cross Section

6 THE SURROUNDING ROAD NETWORK

6.1 MR332 (Main Road)

MR332 is arguably Still Bay's most important transportation arterial. Not just does it play a pivotal role with regards to mobility within the town, it also provides the fastest and most direct link between Still Bay and National Road 2 (N2) towards the North. In the vicinity of the site, MR332 is situated within a 30m road reserve and consists of an undivided single carriageway with one lane in each direction. The North Eastern road edge is protected from ravelling by a mountable kerb. This kerb also provides a grade separation between the road and a concrete surfaced sidewalk. This sidewalk starts at the MR331/MR332 intersection and continues in a Southern direction. The South Western Road edge is unprotected.

Figure 6-1 – Photos of MR332 in both direction

6.2 MR331 (Jongensfontein Road)

MR331 provides a transportation link between Still Bay and Jongensfontein towards the West. In the vicinity of the site, MR331 is situated within a 30m road reserve and consists of an undivided single carriageway with one lane in each direction. The road cross section includes a yellow painted shoulder and road edges are unprotected as indicated in Figure 6-2.

Figure 6-2 – Photos of MR331 towards Jongensfontein

The MR331/MR332 intersection is in the form of a three legged, Stop Controlled intersection. As explained in Section 3 of this report, access to erf 4784 is via a gravel road that forms the un-official fourth leg of the MR331/MR332 intersection. The posted speed limit on both the MR331 and MR332 approaches to the intersection is 60km/h.

6.3 Background Traffic Volumes

Traffic volumes were recorded at the MR331 and MR332 intersections over a 12-hour period from 06:00 to 18:00 on Thursday, 25 July 2019. The raw traffic volume data has been attached as **ANNEXURE C** to this report. The data was analysed to extract the traffic flow profile for each intersection approach. The various flow profiles are important to gain a better understanding of the road's (and more precisely the specific approach to the intersection) function and operational environment.

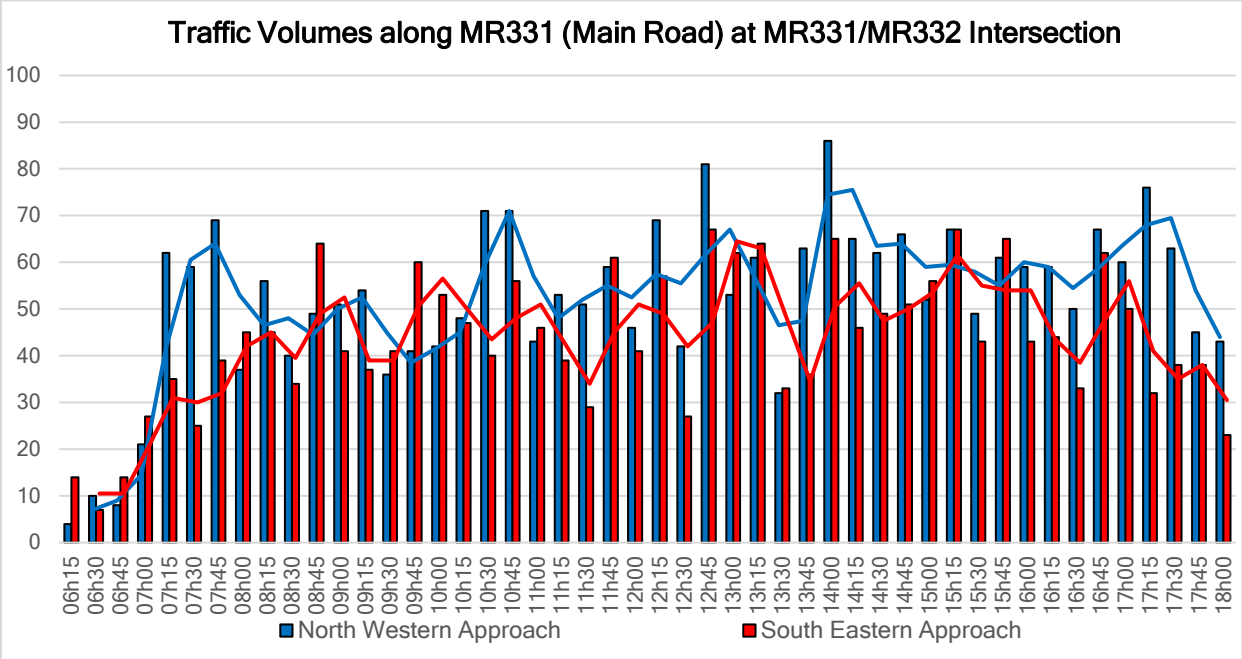


Figure 6-3 - Traffic Volumes along MR331 at MR331/MR332 Intersection

The traffic count revealed fairly constant traffic volumes along both MR332 approaches to the intersection. On both approaches, the maximum 15min traffic volume was recorded during the NM period (between 12:45 and 14:00).

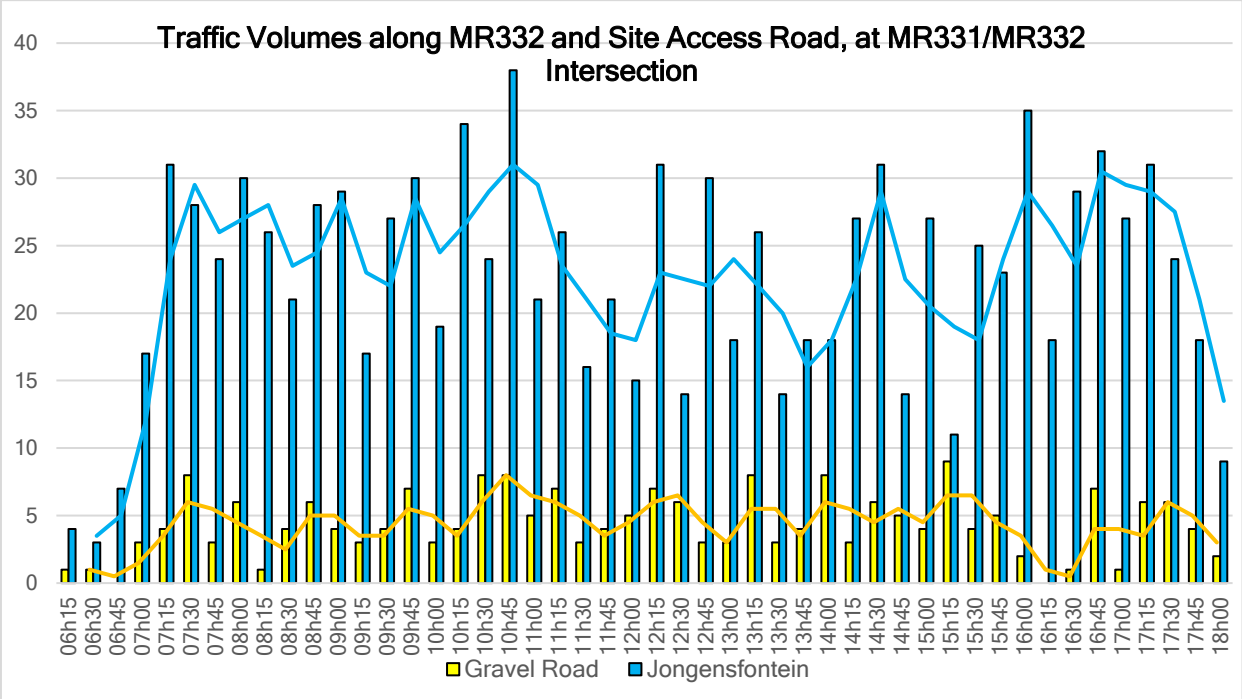


Figure 6-4 - Traffic Volumes along MR332 at MR331/MR332 Intersection

The MR332/Gravel Road approaches to the intersection revealed that traffic along the gravel road was very low, while the largest 15min peak traffic volume period was recorded along the Jongensfontein Road Approach at the 10:30 to 10:45 interval.

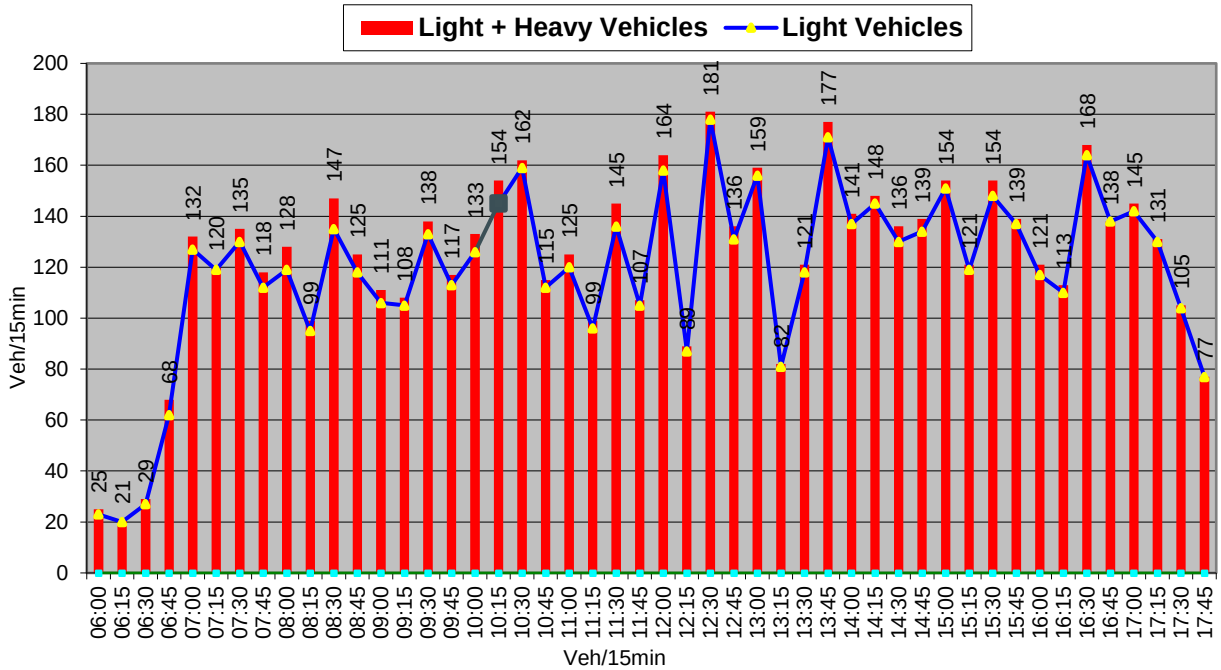


Figure 6-5 - Total Traffic Volumes

The total volume of traffic passing through the intersection, have been indicated in graphical format in Figure 6-5 above.

6.4 Peak Hour Volumes

The traffic counts were further analysed to extract the 2019 traffic volumes for the morning (AM), midday (NM) and afternoon (PM) Peak Hour Periods. The results are attached as Figure A in **ANNEXURE D**. For ease of reference, a summary of the volumes is included in tabular format below:

Intersection		2018 Peak Hour Volumes	
	AM	NM	PM
	(09:45 to 10:45)	(13:45 to 14:45)	(16:30 to 17:30)
MR332 – NW Approach	232	279	266
Gravel Road – NE Approach	23	22	20
MR332 – SE Approach	196	211	182
MR331 – SW Approach	115	90	114

Table 6-1 – MR331/MR332 intersection AM, NM and PM Peak Hour Volumes

6.5 Roadside Development Environment

The concept of Roadside Development Environment recognizes that operating speeds of vehicles are lower in denser developed environments for the same class of road and that drivers can react in a shorter distance. The Access Management Guidelines (Western Cape Government, 2016) identified five different roadside development environments in an effort to recognize that Access Management needs to vary according to the nature of the urban or rural environment through which a particular road passes. Roadside Development Environment (RDE) is specified in terms of overall character and density of adjacent developments. The prime factor used to distinguish between the different types of Roadside Development Environment is development density measured in square metres of floor space per hectare of land. The five different environments are indicated in Table 6-2 below.

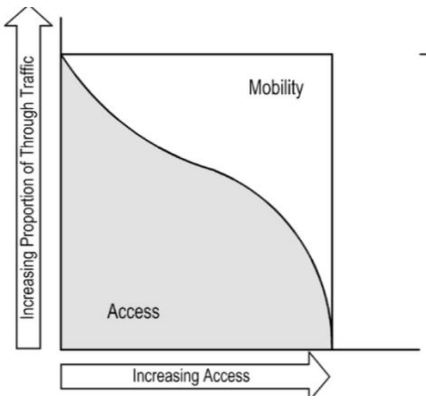
Roadside Environment	Density
Urban	>10,000m^2 GFA per Hectare
Intermediate	3,000 to 10,000m^2 GFA per Hectare
Suburban	1,000 to 3,000m^2 GFA per Hectare
Semi-rural	Small-holdings and small farms
Rural	Agriculture or Large Farms

Table 6-2 - Roadside Development Environment

It is the opinion of the author that the site is situated within the Suburban Roadside Development Environment.

6.6 Road Classifications

Roadways are classified by function on the basis of the priority given to land access versus through-traffic movement. Class 1 and 2 arterial roads provide a predominantly "mobility" function and Classes 4 and 5 roads perform a collector and local "access" function. The functions of "mobility" and "access" overlap on minor arterials (Class 3 roads). This relationship between access and mobility has been indicated schematically in Figure 6-6. Access Management is particularly important along Principal, Major and Minor Arterials and other primary roads that are expected to provide safe and efficient movement of traffic as well as limited access to property. However, Access Management is also necessary on lower-order roadways, such as Collector Streets and Local Streets, to address safety considerations, such as sight distance and corner clearance.



Class	Function	Description
Class 1	Mobility	Principal Arterial
Class 2		Major Arterial
Class 3	Mobility/Access	Minor Arterial
Class 4		Collector
Class 5	Access	Local

Figure 6-6 - Relationship Between Access and Mobility

Depending on which guidelines are being used, the nomenclature used in road classification varies slightly. For ease of reference, the differences between the terms used in the 2006 Department of Transport (DoT) Guidelines and those specified in 2010 in the Road Classification and Access Management Guideline (COTO), are listed below:

Road Class	Function	DoT 2006 Guidelines	COTO 2010 (TRH 26 Manual)
Class 1	Mobility	Primary Distributor	Principal Arterial
Class 2		Regional Distributor	Major Arterial
Class 3		District Distributor	Minor Arterial
Class 4	Access	District Collector	Collector
Class 5		Access Road	Local Street
Class 6		Non-motorised access way	Walkway

Table 6-3 - Road Classification Nomenclature

Both MR331 and MR332 falls under the jurisdiction of the Provincial Government of the Western Cape. This means that planning decisions, maintenance and repairs of these roads are undertaken by the Western Cape's Department of Transport and Public Works and hence any future upgrades must also comply to their minimum norms and standards. Based on the Western Bypass Traffic Investigation report (VKE1065.01.01 VelaVKE Engineers, 2012), MR331 can be classified as a Class 3 District Distributor and MR332 is split between a Class 3 District Distributor and a Class 4 Local Distributor/Collector Road as indicated in Figure 6-7.

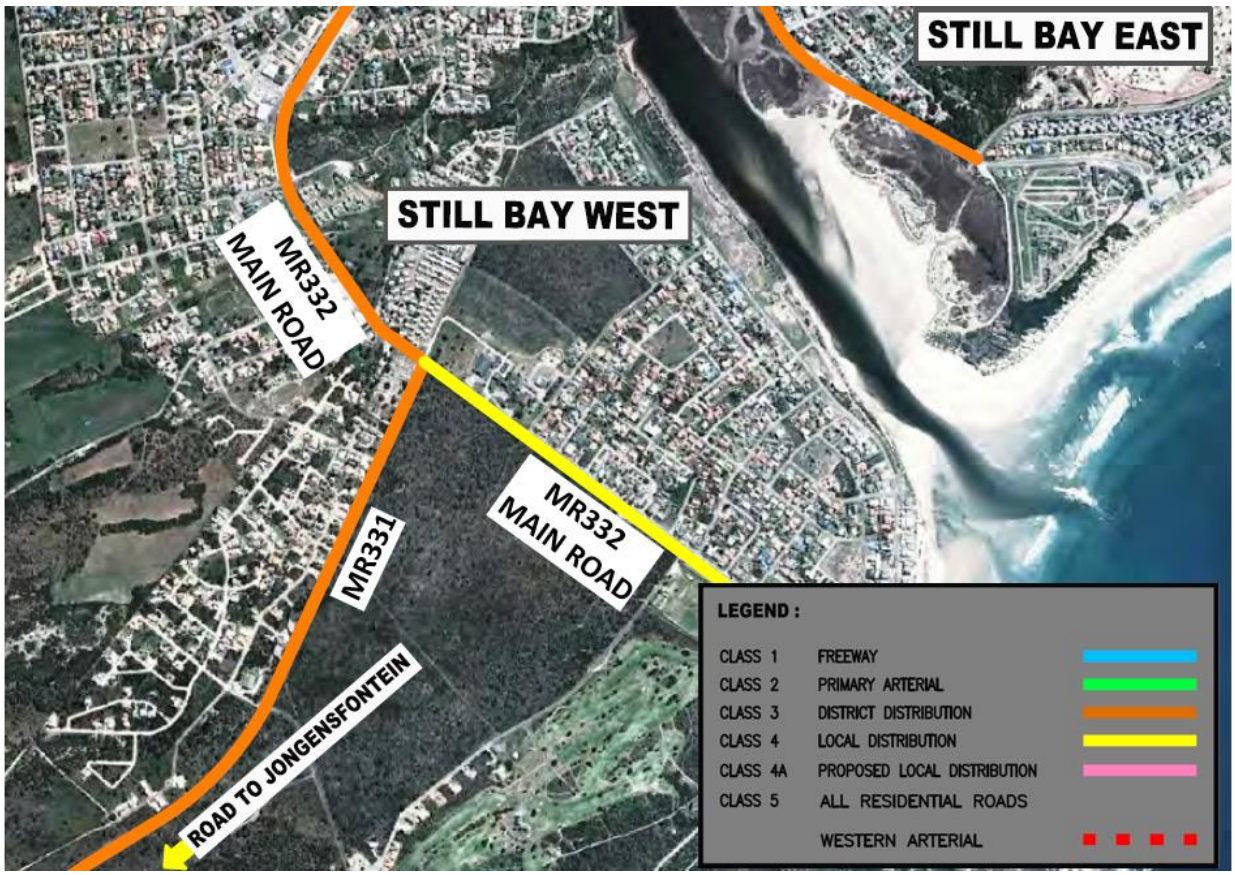


Figure 6-7 - Road Network Classification

The relevant road classification definitions are specified in the TRH 26 (COTO, August 2012) document, and are listed below for ease of reference:

Class 3 District Distributors / Minor Arterials

Urban minor arterials would typically be required to serve traffic in most urban areas, including small towns. In cities and larger towns, these arterials would be used to provide connections between districts of the city or town and form the last leg of the journey on the mobility road network, bringing traffic to within one kilometer of its final destination. In small towns, they would be used to provide general overall mobility to the whole town. The arterials can also be used to serve economic activity centers that are not served by Class 1 or 2 arterials.

The Class U3 arterials should also be used to serve as connectors to rural Class 3 routes. They should preferably start and stop at arterials of equal or one higher Class (2 to 3), but can connect to Class 1 principal arterials.

Minor arterials function as through routes on a district scale. While still carrying predominantly through traffic, they serve shorter distance trips with a length of around 2 km, but can be as short as a single block if connecting higher order routes. The minor arterials would typically carry volumes of traffic of between 10 000 and 40 000 vehicles per day.

Class 4 District Collector / Collector Streets

Collector streets are used to penetrate local neighbourhoods with the purpose of collecting (and distributing) traffic between local streets and the arterial system. The streets are mainly intended to serve an access function with limited mobility and traffic volumes, trip lengths and continuity must be limited. They should not carry any through traffic but only traffic with an origin or destination along or near to the street. The majority of the traffic using the collector street will have a destination in the street itself or in a local street leading off the collector. A collector street must not be quicker to use to pass through an area than a mobility road.

7 TRAFFIC GENERATION EFFECTS OF THE PROPOSED DEVELOPMENT.

7.1 Trip Generation

The South African Trip Data Manual (COTO, May 2018) document was used as the guideline to calculate the peak hour trips expected to be generated by the proposed shopping mall development.

The full calculation sheet has been attached as **ANNEXURE E**, but a summary of the trip generation rates is included below:

Land use	AM Peak		NM Peak		PM Peak	
	Trip Rate	In/Out	Trip Rate	In/Out	Trip Rate	In/Out
Retirement Village	0.35	40:60	0.4	50:50	0.35	50:50
Old Age Home	0.15	65:35	0.35	50:50	0.20	40:60
Nursing Home	0.20	70:30	0.30	40:60	0.20	40:60

Table 7-1 - Trip Generation Rates According to TMH 17

The resultant trip generation figures are included below

Land use	AM Peak			NM Peak			PM Peak		
	Total	In	Out	Total	In	Out	Total	In	Out
Retirement Village	**42**	17	25	**48**	24	25	**42**	21	21
Old Age Home	**1**	1	0	**3**	1	2	**2**	1	1
Nursing Home	**3**	2	1	**5**	3	2	**3**	1	2
Total	**46**	20	26	**56**	28	29	**47**	23	24

Table 7-2 - TRip Generation Values According to TMH 17

7.2 Trip Distribution

The traffic count was analysed to determine the way in which the current traffic distributed at the MR331/MR332 intersection. This actual distribution was used as a guide to determine how the newly generated traffic volumes will also distribute through the junction. The final distribution percentages are based on a combination of the following:

- The envisaged movement of traffic once the development has reached its full potential.
- The actual 2019 Peak Hour traffic background traffic flows.

The estimated traffic distribution percentages (for the AM, NM and PM Peak Hour Periods) at the intersection have been attached as Figure C in **ANNEXURE D**. Applying the trip generation rates from Section 7.1 above, the distribution volumes can be calculated as indicated in Figure D in **ANNEXURE D**.

8 OPERATIONAL ANALYSIS

The operational analysis was done with the "SIDRA INTERSECTION 8" (version 8.0.5) computer software that is suited for traffic engineering capacity analysis. When elements of a road network such as intersections are analysed, their operating conditions are described in terms of Level of Service (LOS). The six letters from A to F are used to indicate different LOS. LOS A indicates very low traffic flows with correspondingly low delays. LOS E reflects capacity conditions, with high delays and unstable flow. LOS F reflects conditions where traffic demand exceeds capacity and traffic experiences congestion and delays. Generally, LOS A to D is considered acceptable in accordance with international standards. LOS E and F on the other hand are considered to be unacceptable.

The Average Delay is the delay in seconds that a motorist is likely to experience on an approach to the junction, while waiting for the junction to clear or other vehicles to manoeuvre. A further measure of the operating conditions at any point in a road network is the volume to capacity ratio (v/c). As the name implies it is the traffic demand volume divided by the available capacity of the road element. Generally, ratios of up to approximately 0.9 are internationally considered acceptable. Values exceeding 1.0 implies saturation of the intersection.

8.1 Status Quo

The Status Quo scenario can also be referred to as the pre-development scenario. The Operational Analysis of the intersection was carried out with the use of the Thursday, 25 July 2019 traffic count data.

The AM, NM and PM status quo scenarios were analysed for the MR331/MR332 intersection. Detailed SIDRA results, including basic layouts of the analysed intersections, have been attached as **ANNEXURE E** to this report, but the LOS, AVERAGE DELAY and VOLUME/CAPACITY RATIO for the three peak hour periods have been summarised in tabular format for ease of reference.

APPROACH	MOVEMENT	2019 AM PEAK HOUR		
		LEVEL OF SERVICE (LOS)	AVERAGE DELAY (seconds)	VOLUME/ CAPACITY RATIO
MR332 (MAIN ROAD) (SE Approach)	Left	B	12.9	0.274
	Through	B	12.6	
	Right	B	12.3	
GRAVEL ROAD (NE Approach)	Left	C	18.3	0.076
	Through	C	17.9	
	Right	C	17.7	
MR332 (MAIN ROAD) (NW Approach)	Left	B	12.1	0.280
	Through	B	11.7	
	Right	B	11.5	
MR331 JONGENSFONTEIN (SW Approach)	Left	F	1862.3	1.933
	Through	F	1861.9	
	Right	F	1861.7	

Table 8-1 - 2019 AM Status Quo, SIDRA Results

APPROACH	MOVEMENT	2019 NM PEAK HOUR		
		LEVEL OF SERVICE (LOS)	AVERAGE DELAY (seconds)	VOLUME/ CAPACITY RATIO
MR332 (MAIN ROAD) (SE Approach)	Left	B	12.7	0.283
	Through	B	12.4	
	Right	B	12.1	
GRAVEL ROAD (NE Approach)	Left	C	20.4	0.081
	Through	C	20.0	
	Right	C	19.8	
MR332 (MAIN ROAD) (NW Approach)	Left	B	11.9	0.312
	Through	B	11.5	
	Right	B	11.3	
MR331 JONGENSFONTEIN (SW Approach)	Left	F	1147.5	1.517
	Through	F	1147.1	
	Right	F	1146.9	

Table 8-2 - 2019 NM Status Quo, SIDRA Results

APPROACH	MOVEMENT	2019 PM PEAK HOUR		
		LEVEL OF SERVICE (LOS)	AVERAGE DELAY (seconds)	VOLUME/ CAPACITY RATIO
MR332 (MAIN ROAD) (SE Approach)	Left	B	13.2	0.268
	Through	B	12.9	
	Right	B	12.7	
GRAVEL ROAD (NE Approach)	Left	C	22.7	0.085
	Through	C	22.3	
	Right	C	22.1	
MR332 (MAIN ROAD) (NW Approach)	Left	B	12.3	0.319
	Through	B	12.0	
	Right	B	11.8	
MR331 JONGENSFONTEIN (SW Approach)	Left	F	93.1	0.754
	Through	F	92.7	
	Right	F	92.5	

Table 8-3 - 2019 PM Status Quo, SIDRA Results

Analyses of the AM, NM and PM Status Quo condition for the MR331/MR332 intersection revealed that the South Western approach (along the MR331) is under severe strain and operating well above capacity during the AM, NM and PM peak hour periods. The poor LOS along the SW approach to the junction is mainly attributed to long delays experienced on the specific approach. The V/C Ratio for this approach is also outside of the acceptable norm, indicating that the approach is fully saturated.

The LOS on the other three approaches are not great but are deemed acceptable.

8.2 The Future Scenario

In order to estimate the future (typically 5 years from now) traffic volumes, the latest (2019) traffic volumes are increased with an annual growth factor. Reference is made to the *TMH 17, South African Trip Data Manual* (COTO, May 2018) which provides a table with typical traffic growth rates. This document recognises that the method for determining traffic growth is important, but also states that there are a number of factors which influence the traffic growth rate. The approach is therefore to classify the study area with a low, average, or high growth rate. The typical growth rates are indicated in Table 8-4 below:

Category	Yearly Growth Rate (%)
Low	0-3%
Average	3-4%
Above Average	4-6%
Fast Growing Area	6-8%
Exceptionally High Growth	>8%

Table 8-4 - Typical Traffic Growth Rates

When compared to the 5 categories above, the site falls into the "average" growth rate category and hence it was decided to apply a fairly conservative growth rate factor of 3% to the background traffic volumes. The estimated 2024 traffic volumes are therefore calculated based on the equation below:

$$F = P \times (1 + i)^n$$

Where: F = Future Trips
P = Present Trips
n = 5 years
i = 3% Growth

The number of trips generated by the development are then added to the estimated future (2024) background volumes, in order to obtain the all-inclusive future scenario.

The estimated 2024 background traffic volumes have been attached as Figure E and the 2024 Background + Generated Traffic Volumes as Figure F in **ANNEXURE D**.

Using the traffic volumes from Figure F (2024 Background + Generated Traffic) the relevant intersections were once again analysed using SIDRA Computer Software. The detailed SIDRA results have also been attached as **ANNEXURE F** to this report, but the findings have been summarised in tabular format on the following pages.

APPROACH	MOVEMENT	2024 AM PEAK HOUR		
		LEVEL OF SERVICE (LOS)	AVERAGE DELAY (seconds)	VOLUME/ CAPACITY RATIO
MR332 (MAIN ROAD) (SE Approach)	Left	B	14.3	0.353
	Through	B	14.0	
	Right	B	13.8	
GRAVEL ROAD (NE Approach)	Left	C	18.4	0.154
	Through	C	18.0	
	Right	C	17.8	
MR332 (MAIN ROAD) (NW Approach)	Left	B	13.6	0.370
	Through	B	13.2	
	Right	B	13.0	
MR331 JONGENSFONTEIN (SW Approach)	Left	F	2339.4	2.207
	Through	F	2339.1	
	Right	F	2338.9	

Table 8-5 - 2024 AM Peak Hour SIDRA Results

The additional AM traffic generated by the proposed development, has very little impact on the already saturated intersection. V/C ratio for the MR331 (Jongensfontein) approach increases from 1.933 to 2.207 after inclusion of the additional generated traffic. (A ratio of >1 indicates saturation of the intersection)

APPROACH	MOVEMENT	2024 NM PEAK HOUR		
		LEVEL OF SERVICE (LOS)	AVERAGE DELAY (seconds)	VOLUME/ CAPACITY RATIO
MR332 (MAIN ROAD) (SE Approach)	Left	B	14.3	0.371
	Through	B	14.0	
	Right	B	13.7	
GRAVEL ROAD (NE Approach)	Left	C	20.4	0.178
	Through	C	20.1	
	Right	C	19.9	
MR332 (MAIN ROAD) (NW Approach)	Left	B	13.7	0.419
	Through	B	13.3	
	Right	B	13.1	
MR331 JONGENSFONTEIN (SW Approach)	Left	F	1543.9	1.750
	Through	F	1543.6	
	Right	F	1543.3	

Table 8-6 - 2024 NM Peak Hour SIDRA Results

Once again, the addition of the newly generated traffic has very little impact on the already poor level of service at the intersection.

APPROACH	MOVEMENT	2024 PM PEAK HOUR		
		LEVEL OF SERVICE (LOS)	AVERAGE DELAY (seconds)	VOLUME/ CAPACITY RATIO
MR332 (MAIN ROAD) (SE Approach)	Left	B	14.2	0.334
	Through	B	13.9	
	Right	B	13.6	
GRAVEL ROAD (NE Approach)	Left	C	22.7	0.179
	Through	C	22.4	
	Right	C	22.2	
MR332 (MAIN ROAD) (NW Approach)	Left	B	13.7	0.407
	Through	B	13.4	
	Right	B	13.1	
MR331 JONGENSFONTEIN (SW Approach)	Left	F	97.2	0.794
	Through	F	96.9	
	Right	F	96.7	

Table 8-7 - 2024 PM Peak Hour SIDRA Results

Level of Service remains unchanged, average delay and V/C ration deteriorates even further.

9 MITIGATION MEASURES

In order to try and mitigate the poor LOS at the MR331/MR332 intersection, the following geometric improvements were analysed, while still using the same traffic volumes.

Option 1 – Addition of a Left turn Lane on the MR331 (Jongensfontein) approach.

Option 2 – Conversion of 4-Way Stop to a 2-Way Stop with the MR332 approaches (Main Road) set as the major road (priority movement).

Option 3 – Conversion of 4-Way Stop to a Traffic Circle

9.1 Option 1

Option 1 consists of the addition of a dedicated right turn lane on the MR331 (Jongensfontein) approach to the intersection, while still keeping the 4-way stop controlled configuration. A basic layout of the proposed improvement has been included as Figure 9-1.

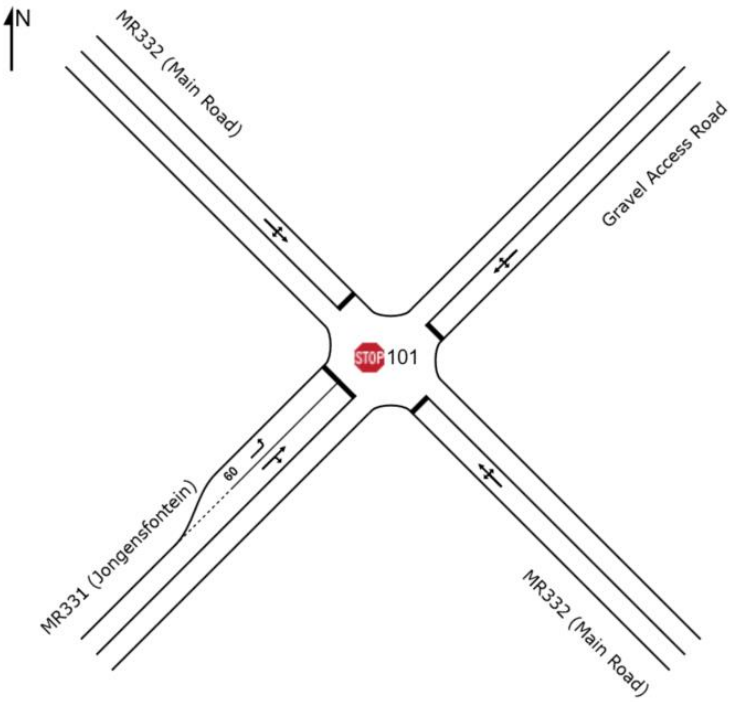


Figure 9-1 - Option 1 Layout Plan

SIDRA analyses of the intersection layout (using the exact same 2024 Future + Generated traffic volumes) revealed the following:

APPROACH	MOVEMENT	AM PEAK HOUR			NM PEAK HOUR			PM PEAK HOUR		
		LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
MR332 (MAIN ROAD) (SE Approach)	Left	B	14.3	0.353	B	14.3	0.371	B	10.8	0.426
	Through	B	14.1		B	14.0		C	15.7	
	Right	B	13.8		B	13.7		C	15.5	
GRAVEL ROAD (NE Approach)	Left	C	24.8	0.217	D	30.0	0.265	C	22.7	0.179
	Through	C	24.4		D	29.7		C	22.4	
	Right	C	24.2		D	29.5		C	22.2	
MR332 (MAIN ROAD) (NW Approach)	Left	B	13.6	0.370	B	13.7	0.419	C	15.8	0.466
	Through	B	13.3		B	13.4		C	15.4	
	Right	B	13.3		B	13.5		C	15.2	
MR331 JONGENSFONTEIN (SW Approach)	Left	F	66.8	0.662	F	61.7	0.592	F	97.2	0.794
	Through	E	35.2		E	35.3		F	96.9	
	Right	E	35.0		E	35.1		F	97.0	

Table 9-1 - Option 1 - SIDRA Results

The construction of a dedicated right turn lane showed minor improvements to the overall level of service of the intersection, but in general the intersection does still not operate at an acceptable level of performance.

9.2 Option 2

Option 2 simply consists of the conversion of the current 4-way stop controlled intersection, to a 2-way stop controlled intersection. Priority is allocated to the MR332 (Main Road) approaches since the bulk of the through traffic is along these approaches. The advantage of this configuration is that the traffic approaching the intersection via the MR332 approaches, clears the intersection a lot quicker, creating more opportunities for the MR331 and Gravel road approaches to also enter the intersection. A basic layout plan has been included as Figure 9-2

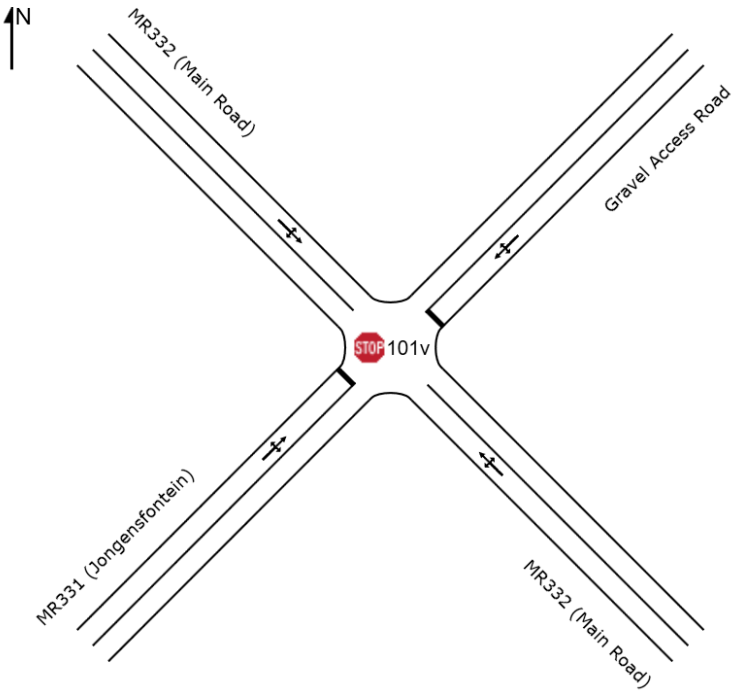


Figure 9-2 - Option 2 Layout Plan

SIDRA analyses of the 2-Way Stop controlled intersection layout (using the exact same 2024 future + generated traffic volumes) revealed the following:

APPROACH	MOVEMENT	AM PEAK HOUR			NM PEAK HOUR			PM PEAK HOUR		
		LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
MR332 (MAIN ROAD) (SE Approach)	Left	A	5.7	0.124	A	5.8	0.135	A	5.8	0.116
	Through	A	0.0		A	0.1		A	0.1	
	Right	A	6.2		A	6.4		A	6.2	
GRAVEL ROAD (NE Approach)	Left	A	8.9	0.099	A	9.0	0.107	A	8.9	0.077
	Through	B	10.8		B	11.6		B	11.0	
	Right	B	11.9		B	12.6		B	12.2	
MR332 (MAIN ROAD) (NW Approach)	Left	A	6.3	0.154	A	6.4	0.190	A	6.3	0.181
	Through	A	0.3		A	0.4		A	0.4	
	Right	A	6.3		A	6.4		A	6.2	
MR331 JONGENSFONTEIN (SW Approach)	Left	A	8.8	0.152	A	8.9	0.123	A	8.8	0.164
	Through	B	11.0		B	11.6		B	11.3	
	Right	B	11.4		B	12.2		B	12.0	

Table 9-2 - Option 2 - SIDRA Results

SIDRA Analyses of the 2-Way stop controlled intersection revealed that the intersection performance shows a drastic improvement. LOS for all the approaches are well within the acceptable range and Average Delay and V/C show remarkable improvement.

9.3 Option 3

Option 3 consist of major geometric improvement and included the conversion of the stop controlled intersection to a traffic circle. A basic layout plan has been included as Figure 9-3.

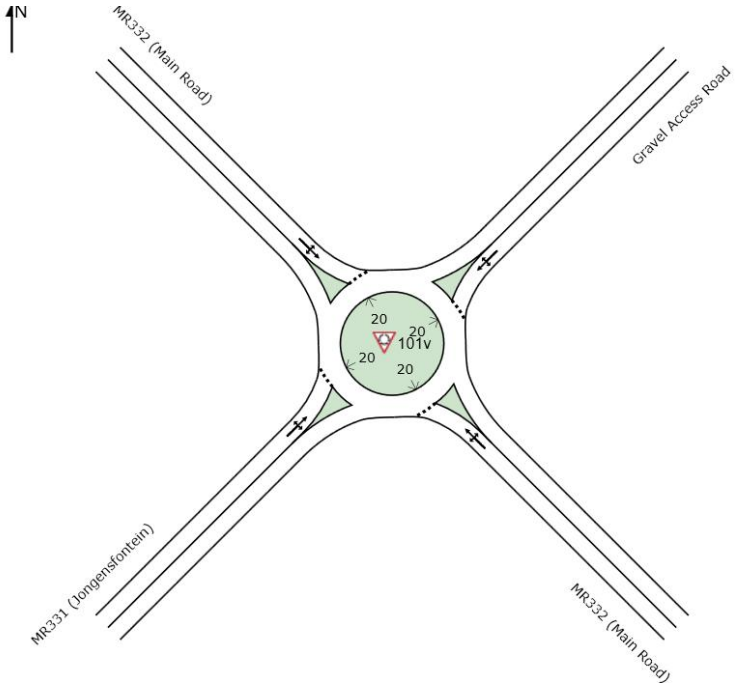


Figure 9-3 - Option 3 Layout Plan

SIDRA analyses of the traffic circle controlled intersection layout (using the exact same 2024 future + generated traffic volumes) revealed the following:

APPROACH	MOVEMENT	AM PEAK HOUR			NM PEAK HOUR			PM PEAK HOUR		
		LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
MR332 (MAIN ROAD) (SE Approach)	Left	A	4.5	0.181	A	4.7	0.203	A	4.6	0.175
	Through	A	4.7		A	4.9		A	4.9	
	Right	A	9.4		A	9.6		A	9.5	
GRAVEL ROAD (NE Approach)	Left	A	5.5	0.050	A	5.8	0.053	A	5.8	0.047
	Through	A	5.8		A	6.1		A	6.1	
	Right	B	10.4		B	10.7		B	10.7	
MR332 (MAIN ROAD) (NW Approach)	Left	A	4.1	0.194	A	4.1	0.229	A	4.2	0.227
	Through	A	4.4		A	4.4		A	4.5	
	Right	A	9.0		A	9.0		A	9.1	
MR331 JONGENSFONTEIN (SW Approach)	Left	A	5.3	0.123	A	5.3	0.096	A	5.1	0.118
	Through	A	5.6		A	5.6		A	5.4	
	Right	B	10.2		B	10.2		B	10.0	

Table 9-3 - Option 3 - SIDRA Results

Analyses indicates that the geometric upgrade from 4-way stop to traffic circle results in major improvement of the status quo condition. However, the improvement is only slightly better than that of Option 2 (conversion from 4-way stop to 2-way stop)

10 SITE ACCESSES

Based on the AMG (Western Cape Government, 2016), the term "driveway" describes the intersecting roadway giving direct access to a privately owned property adjacent to the road where such roadway is not a street. A driveway is usually the only access point to the property, but larger developments may have access through more than one driveway from more than one road. The AMG further defines the following driveway categories:

Domestic Equivalent Driveways

These types of driveways give vehicular access to private homes and micro businesses which attract very small traffic volumes, and where typically the vehicle using the driveway must back into the through road when leaving the property. Domestic equivalent driveways have a small impact on the through road but can result in conflicts where reversing manoeuvres take place into the through road

Low Volume Driveways

These types of Driveways carry larger traffic volumes than domestic equivalent driveways and are expected to serve larger developments. The lower volume driveway categories (Domestic equivalent driveways and Low Volume driveways) have no class equivalent as they carry lower volumes than the traffic volume carried by any class of road. Internal site design must allow all vehicles to be able to depart the site traveling forwards and not by reversing.

High Volume Driveways

These types of driveways are equivalent to Class 5 local roads and are expected to carry larger traffic volumes than low-volume driveways.

Equivalent Driveways

The driveways have the categories Equivalent Collector, Equivalent Minor Arterial and Equivalent Major Arterial which are correlated to be equivalent to intersecting road classes 4, 3 and 2 respectively, intersecting with the route being considered.

The threshold volumes for the respective driveways are listed below

Driveway Category	Class Equivalent	Roadside Development Environment				
		CBD	Intermediate	Sub urban	Semi Rural	Rural
		Vehicles per hour				v.p.day
Domestic Equivalent		≤5	≤5	≤5	≤5	≤10
Low Volume		≤30	≤30	≤30	≤30	≤30
High Volume	5	>30	>30	>30	>30	>30
Equivalent Collector	4	>150	>100	>60	>50	>50
Equivalent Minor Arterial	3	>750	>625	>500	>250	>500
Equivalent Major Arterial	2	>1500	>1250	>1000	>500	>1000

Table 10-1 - Driveway Categories

Based on the estimated trip generation volumes specified in Annexure E, the Gravel Access Road towards the site can be classified as falling within the *High Volume Driveway* Category.

11 THROAT LENGTHS

The rezoning application makes provision for a gatehouse structure at the entrance to the proposed development. This is an indication that ingress in to the development will be controlled by means of a boom and/or security guard. Where some form of control is provided on the access, the ingress throat must be of sufficient length to prevent queue spillback onto the surrounding public road or street system. Even though the details regarding the gatehouse was not yet available at the time of writing this report, the 90th percentile queue length (for a gate/boom) may be determined by means of the formula described below.

$$Traffic\ Ratio = \frac{Total\ Traffic\ Volume/PHF}{Service\ Flow\ Rate}\ 100$$

The Peak Hour Factor (PHF), is the factor required to convert the hourly volume to a peak 15-minute volume. Service Flow Rate for various types of access control are indicated in Table 11-1

Service flow rates (veh/h) fo different control types	
Control type	Service flow (vph)
Swipe magnetic card	480
Remote controlled gates	450
Ticket dispenser: Automatic	390-450
Ticket dispenser: Push button	220-360
Pin number operated gates	150
Pay fee on entry	120
Cell-phone operated gates(gate opens when a call is receieved)	100
Manual recording, Visitor completes form	80
Intercom operated gates(visitor contacts resident by intercom)	50

Table 11-1 - Service Flow Rates for Different Control Types

For worst case planning purposes, it is assumed that the control type will be in the form of Intercom operated gate, where visitors are required to contact residents by means of an intercom system. Based on Figure F in Annexure D, the most trips into the development are expected during the NM peak hour period and hence this scenario will be used to determine the calculations going forward.

For this proposed development, the relevant throat length formula variables are therefore as follows:

- Total Traffic Volume ($_{NM\ ingress}$) : 29
- PHF : 4
- Service Flow Rate ($_{Manual\ Recording,\ Visitors\ completes\ form}$) : 50

Thus, populating the throat length formula with the above variables yield, the following:

$$Traffic\ Ratio = \frac{\left(\frac{29}{4}\right)}{50(Intercom\ Operated)}\ 100$$

From which it follows that Traffic Ratio = 14,5. Comparing the calculated traffic ratio to Table 11-2 (1-Channel scenario), it follows that a minimum storage length (N_{Que}) of one (1) vehicles is required in front of the gatehouse.

95th Percentile queue length (vehicles per channel) at controlled accesses						
Storage (Vehs)	Traffic ratio (Pecentage) for different Numbers of Channels					
N_{Que}	1 Channel	2 Channel	3 Channel	4 Channel	5 Channel	6 Channel
1	23	58	97	140	188	235
2	39	94	155	220	292	363
3	49	115	186	261	341	421
4	56	128	205	283	367	449
5	61	137	216	297	382	466
6	65	143	22	306	392	476
7	68	147	229	312	399	484
8	70	151	233	317	403	489
9	71	153	236	321	407	493
10	73	155	239	324	410	496

Table 11-2 - 95th Percentile Queue Length at Controlled Accesses

12 TURNING LANES

The 2002 guideline document published by the Provincial Administration Western Cape, (*Road Access Guidelines,*) was used to determine whether left and/or right turning lanes are warranted at the MR331/MR332 intersection as a result of the additional generated traffic.

12.1 Right Turning Lanes

The guidelines for implementing right turn lanes for the AM, NM and PM Peak Hours are indicated in Figure 12-1. The NM Peak Hour period marginally satisfies a Right Turn lane, but the AM and PM Peak hours do not satisfy the requirements.

12.2 Left Turning Lanes

The left turning lane warrant is also indicated in Figure 12-1. Once again, the AM, NM and PM Peak hour periods were investigated and neither of them satisfied the requirements for either a taper or a dedicated left turn lane.

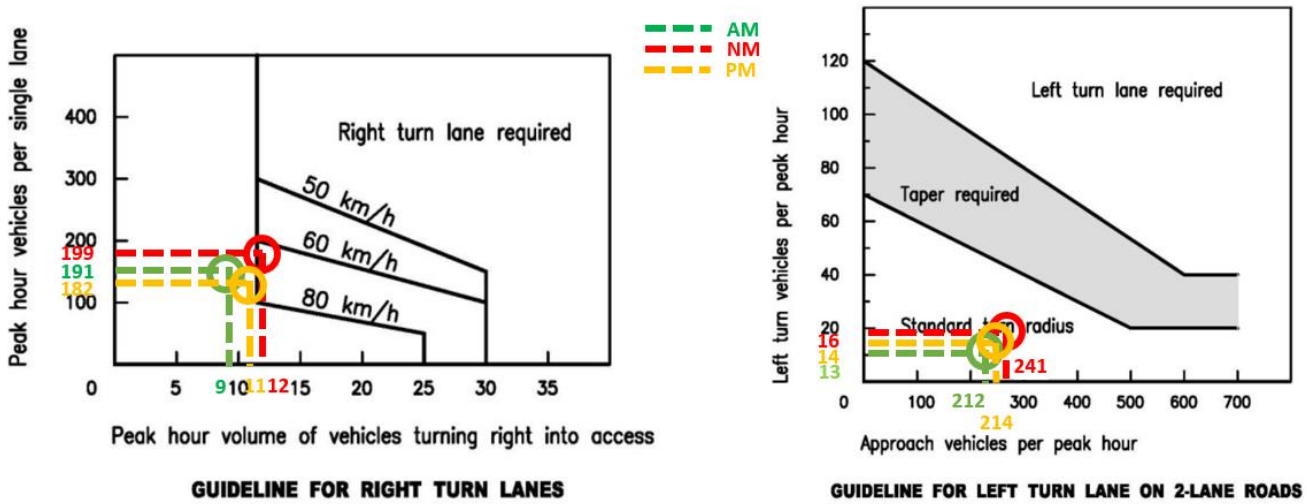


Figure 12-1 - Warrant for Left and Right Turn Lanes

13 PARKING

The parking offering in the SDP were checked for compliance to the Draft Hessequa Zoning Scheme By-law (Province of the Western Cape, January 2018). The requirements specified in the zoning Scheme document have been summarised below for ease of reference.

Land Use		Normal Areas
Retirement Resort	Dwelling Unit	2 bays per dwelling plus 0.25 bays/unit for visitors
	Home for the Aged	0.5 Bays per bedroom
	Frail Care	0.5 bays per bedroom

Table 13-1 - Minimum off-street parking requirements according to Hessequa Draft IZSBL

The individual dwelling units include either a single or double carport structure at each unit. Based on the SDP the split between single and double car ports are as follows:

Single = 79 units

Double = 41

An additional 37 parking bays are available next to the frail care and assisted living areas, bringing the total parking offering to 198 parking bays.

Based on the requirements of table Table 13-1, the parking requirements are as follows:

Description	Units or beds	Parking Bays required	Parking Bays offered
Retirement Village	120	270	161
Old Age Home	8	4	15
Nursing Home	32	16	22
Total		290	198

Table 13-2 - Hessequa IZSBL - Parking Requirements vs Offering

Based on the Hessequa Zoning Scheme By-Law, the parking offering does not comply to the minimum requirement. However, it is the opinion of the author of this report that the Hessequa zoning scheme by-law requirement of 2.25 parking bays per retirement village unit might be slightly excessive. As a comparison, the specifications of the South African Parking Standards Document (BKS Inc., Novmber 1985) specifies the following with regards to this type of development.

Land Use	Specification	Requirement	Offering
Dwelling Unit of 2 habitable rooms	1 bay per unit	120 bays	161
Old Age Homes	0.3 bays per habitable room	3 bays	15
Small Private hospital and clinic	1 bays per bed	32 bays	22
Total		155 bays	198 bays

Table 13-3 - Parking Standards Document - Parking requirements vs Offering

14 NON MOTORISED TRANSPORT

According to the SA Department of Social Development's White Paper on the Rights of Persons with Disabilities (December 2015), **Universal Access** is defined as: *"The removal of cultural, physical, social and other barriers that prevent people with disabilities from entering, using or benefiting from various systems of society that are available to other citizens & residents".*

The same document defines **Universal Design** as: *"The design of products, services and environments to be usable by all people, to the greatest extent possible, without the need for personal adaptation or special design".*

At the heart of Universal Accessibility (UA) compliance, is a concept that moves away from a single car, single driver situation, towards a more pedestrian friendly environment that is safe for use by all road users (including and especially special needs persons). Where possible, special attention should be given to residential developments and they should aim to create safer and more pedestrian friendly verges along its transportation corridors, and within residential developments.

The importance of Universal design is especially important when it comes to the needs of special needs persons such as the elderly. Where practically possible, the walkway should not be placed directly up against the road edge, but a furniture zone should be created between the road edge and the sidewalk, increasing the safety of those making use of the walkways. The various road verge components are indicated in Figure 14-1, and the recommended dimensions for the various road verge components indicated in Figure 14-2.

Possible ways of increasing pedestrian safety within the proposed developments include:

- Pedestrians must be made as visible as possible by installing adequate street lighting
- Paving palettes should reflect colour & texture contrasts that are suitable for partially sighted persons, & persons with other special needs.
- Ensure road crossings are visible with clear lines of sight (for motorists & pedestrians)
- Limit crossing distance / time pedestrians are exposed to traffic
- Reducing curve radii (taking note of vehicle turn requirements)
- Reduce traffic lane widths and remove road shoulders
- Add bump-outs and pedestrian barriers where relevant
- Setting of appropriate speed limits

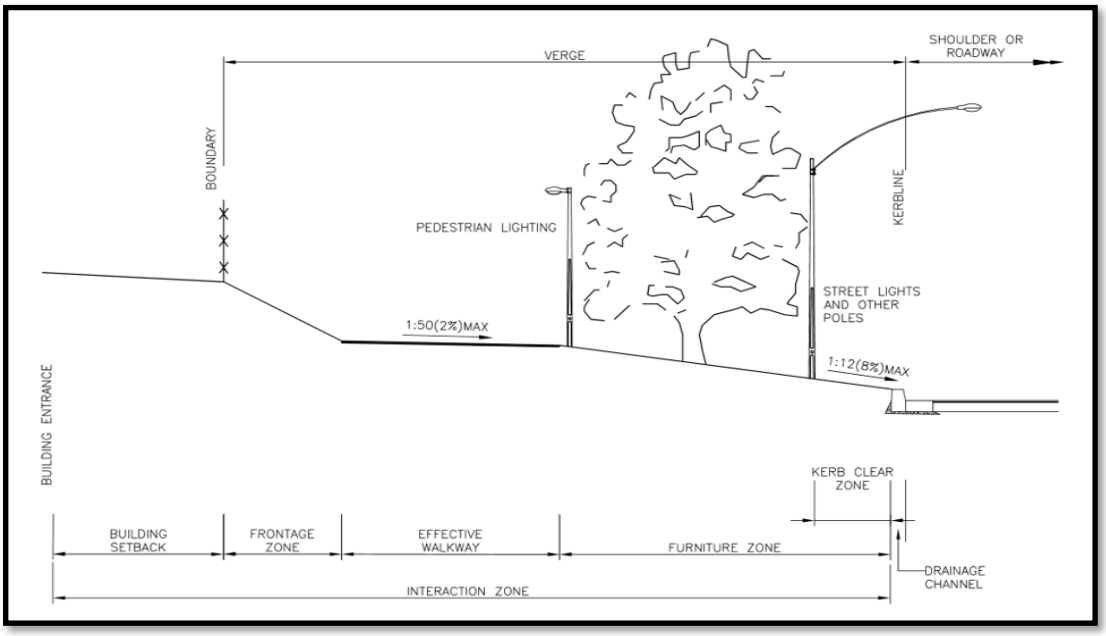


Figure 14-1 - Road Verge Components

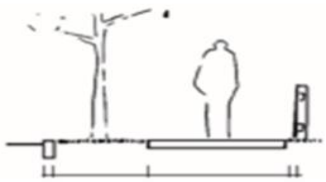
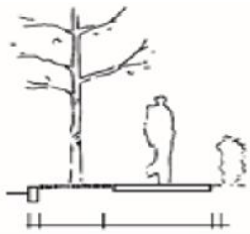
Verge or Sidewalk Corridor	Application	Recommended configuration
≈ 3.7 m	**Recommended** for walkways along main bus routes, or for local streets in pedestrian active areas and for streets where the reserve is some 18.0m wide	Kerb zone: 150 mm; Furniture zone: 1.2 m; Through pedestrian zone: 1.8m; Frontage zone: 450 mm
≈ 3.4 m	**Recommended** for access roads where reserve width is say 15.0 m **Accepted** for verges where the road reserve width is 15.0 m provided that the *effective through pedestrian zone* is 1.8 m	 Kerb zone: 150 mm; Furniture zone: 1.2 m; Through pedestrian zone: 1.8 m; Frontage zone: 150 mm
≈ 3.0 m	**Recommended** for local area walkways in residential zones of R-7 or less dense where ROW width is less than 15.0 m	 Kerb zone: 150 mm; Furniture zone: 1.2 m; Through pedestrian zone: 1.5 m; Frontage zone: 150 mm

Figure 14-2 - Road Verge Component Dimensions

15 SUMMARY

In short, this report can be summarised as follows:

1. The rezoning application is based on the proposed development of the following components:

   Retirement Village – 120 units

   Old-Age Home (Assisted Living) – 8 units

   Nursing Home (32 beds)

2. A 12-hour classified traffic count was recorded at the intersection of MR332 and MR331 on Thursday 25 July 2019. Based on the traffic count and the subsequent SIDRA analyses of the traffic volumes, the intersection is currently operating at unacceptable poor levels of service.
3. Trip Generation calculations indicates that at the worst-case scenario, an additional 28 IN and 29 OUT trips are expected to be generated by the proposed development during the Weekday NM Peak Hour Period.
4. Adding the additional trips to the already saturated intersection had no real tangible impact on the intersection and LOS on the approaches remained unchanged.
5. In order to improve the current status quo of the MR331/MR32 intersection, the following three possible upgrades were analysed:
   a. Addition of a right turn lane on the MR331 approach
   b. Conversion of the current 4-Way Stop Controlled intersection to a 2-Way Stop Controlled intersection
   c. Conversion of the current 4-Way Stop Controlled intersection to a traffic circle.
6. Left and Right turn lanes into the development are not warranted.
7. A minimum throat length of 5m is required and based on the proposed layout, this requirement is deemed satisfied.
8. The parking offering is less than that specified by the Hessequa Draft Integrated Zoning Scheme By-law, but more than that specified by the South African Parking Standards Document. The parking offering is therefore deemed acceptable.

16 RECOMMENDATIONS

1. In 2020, Hessequa Municipality commenced with the process of compiling an Arterial Management Plan (AMP) for the MR332. The purpose of the AMP is to evaluate the MR332 from a holistic and long-term point of view, taking all current and proposed future development along the corridor into account. The MR331/MR332 intersection has been identified as one of the specific focus points of the AMP. For this reason, despite all the options investigated as part of this report, it is recommended that the current layout of the MR331/MR332 intersection remains unchanged until the findings of the AMP has been determined. This will help ensure uniformity and progression along the entire length of the MR332 corridor.
2. The current Gravel road access should be upgraded to a formal surfaced road. In order to create a visual discrepancy between the two provincial roads (MR331 and MR32) and the access into

the retirement village, this access road could be constructed by means of interlocking paving blocks instead of asphalt.

3. The development of erf 4784 should be subject to the construction of a new pedestrian sidewalk starting at the security gate, down to the MR332 and for a minimum distance of approximately 300m in a North Western direction. The sidewalk will provide the elderly a safe passageway to reach the nearest local community shopping centre situated towards the North West of the site. This will also help to reduce the number of vehicular trips generated by the development.

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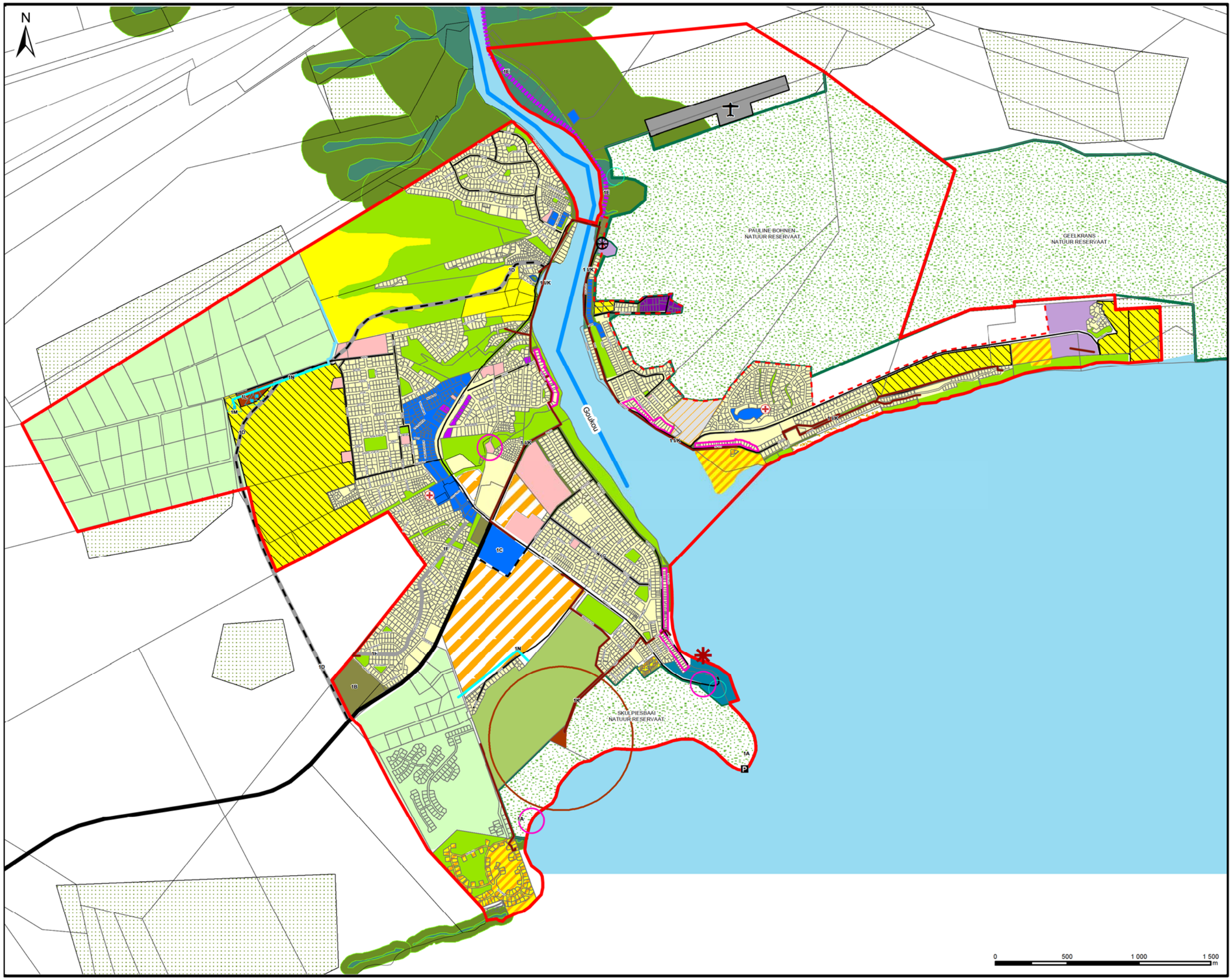
ANNEXURE A

HESSEQUA SPATIAL DEVELOPMENT FRAMEWORK



HESSEQUA

KONSEP RUIMTELIKE ONTWIKKELINGS-RAAMWERK

RUIMTELIKE VOORSTELLE: STILBAAI

RUIMTELIKE BEPLANNINGSEENHEDE

- GETRANSFORMEERDE AREA
- BEWARINGSAREA
- KRITIESE BIODIVERSITEIT AREA (CBA) BUFFER
- KRITIESE BIODIVERSITEIT AREA (CBA)
- LANDBOU
- BUFFER SONE
- CSIR DUINE BESTUURSPLAN
- NATUUR RESERVAAT
- STILBAAI BESKERMDE MARIENE AREA
- RIVIERE

RESIDENSIEEL

- BESTAANDE ONTWIKKELDE AREA
- EKSTENSIEF RESIDENSIEEL
- VOORGESTELDE LAE DIGTHEID (< 15u/ha)
- VOORGESTELDE LAE EN MEDIUM DIGTHEID
- VOORGESTELDE HOë DIGTHEID (> 35 u/ha)
- VOORGESTELDE VERDIGTINGSGEBIED
- OORD
- GEMENGDE BEHUISING TIPOLOGIE
- NOOD BEHUISING
- HOTEL

BESIGHEID EN INDUSTRIEEL

- SSK
- SAKENODUS
- BESIGHEID
- GEMENGDE GRONDGEBRUIKE
- DIENSBEDRYF
- VOORGESTELDE DIENSBEDRYF
- LIGTE INDUSTRIE
- VOORGESTELDE LIGTE INDUSTRIE

GEMEENSKAPSFASILITEITE

- AKTIWITEITSAREA
- GEMEENSKAPSFASILITEITE
- VOORGESTELDE GEMEENSKAPSFASILITEITE
- OOP RUIMTE
- GHOLFBAAN
- BEGRAAFPLAAS
- INFORMELE BESIGHEID
- TOERISME EN PLAASLIKE EKONOMIESE ONTWIKKELING

ANDER

- Oowerheid
- DIENSTE OPGRADERINGSPROJEKTE >R1000 000
- 500m RIOOL BUFFER
- HISTORIESE GEBIED
- HISTORIESE KULTURELE BATES
- VLIEGVELD
- VOORGESTELDE HOTEL
- HOSPITAAL / KLINIEK
- HAWE

PAAIE

- VERSPREIDER
- VERSAMELROETE
- VOORGESTELDE ROETE
- AKTIWITEITSROETE

STEDELIKE GRENS

- HOë PRIORITEITSGRENS
- LAE PRIORITEITSGRENS

INFRASTRUKTUURPROJEKTE < R1000 000

- VOORGESTELDE / OPGRADERING VAN BESTAANDE PAD
- VOORGESTELDE / OPGRADERING VAN BESTAANDE RIOOL LYN
- VOORGESTELDE / OPGRADERING VAN BESTAANDE WATER PYP
- VOORGESTELDE / OPGRADERING VAN BESTAANDE SUBSTASIE
- VOORGESTELDE / OPGRADERING VAN BESTAANDE RESERVOIR

DATE: APRIL 2017	HESSEQUA MUNISIPALITEIT
SCALE: 1:25 000	
DRAWING NO: 5.1	DIREKTORAAT: ONTWIKKELINGSBEPLANNING
FILE NAME: Plan - Ruimtelike Voorstelle STILBAAI	

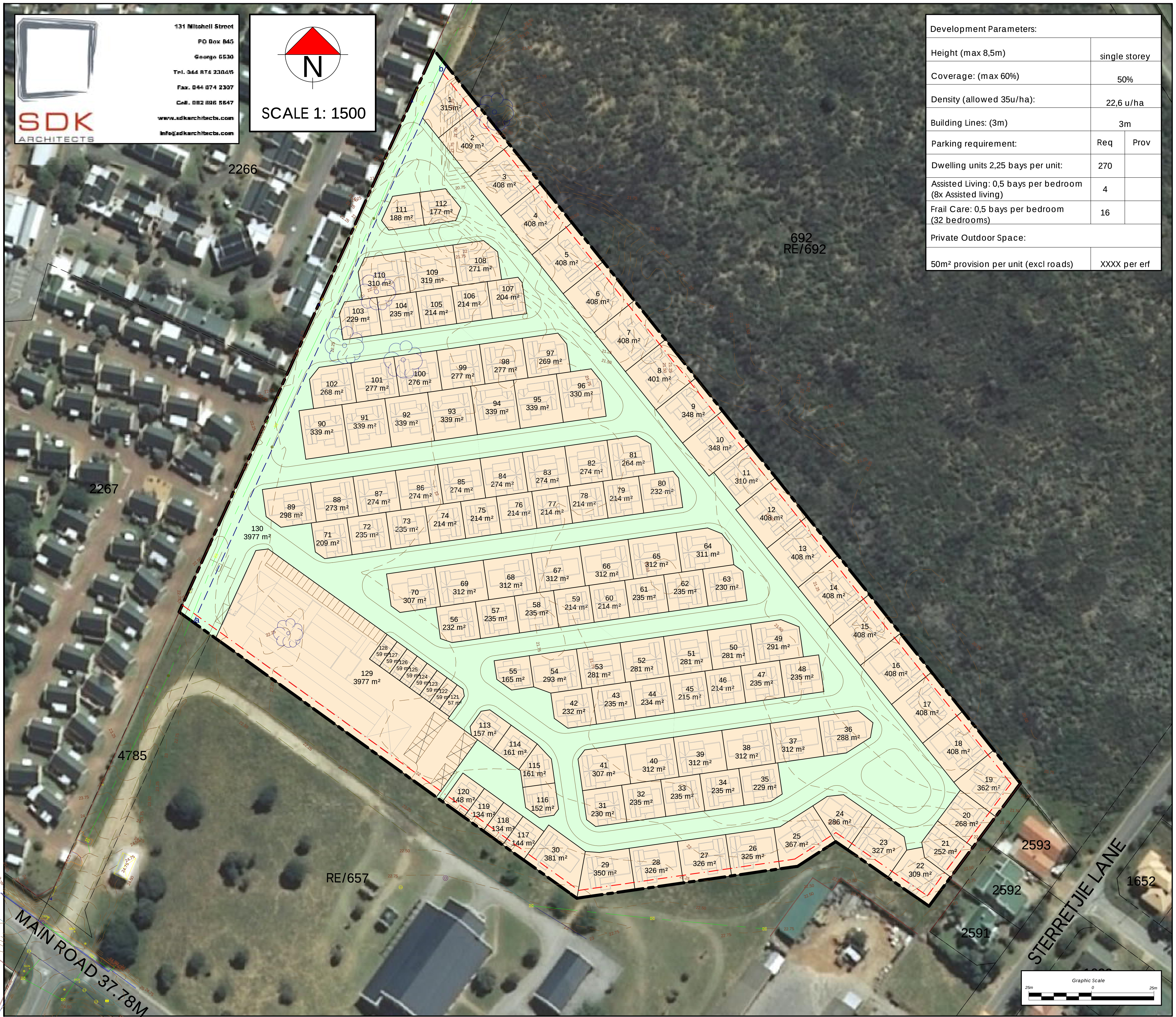
INDEMNITY

Under no circumstances shall the Hessequa Municipality be held liable for any consequential damages or loss of profit resulting from accuracy or completeness of data here presented.

URBAN DYNAMICS MAKES NO WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED, WITH REGARD TO THE DATA AND SHALL NOT BE HELD LIABLE IN ANY EVENT FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE USE OF THIS DATA. THE DATA REMAINS THE SOLE PROPERTY OF THE CLIENT AND MAY ONLY BE USED FOR THE PURPOSES OF A PROJECT WITH THE PRIOR WRITTEN APPROVAL OF THE CLIENT.

ANNEXURE B
SITE DEVELOPMENT PLAN

SDK ARCHITECTS
131 Mitchell Street
PO Box 845
George 6530
Tel. 044 874 23045
Fax. 044 874 2307
Cell. 082 896 5647
www.sdkarchitects.com
info@sdkarchitects.com



Development Parameters:		
Height (max 8,5m)	single storey	
Coverage: (max 60%)	50%	
Density (allowed 35u/ha):	22,6 u/ha	
Building Lines: (3m)	3m	
Parking requirement:	Req	Prov
Dwelling units 2,25 bays per unit:	270	
Assisted Living: 0,5 bays per bedroom (8x Assisted living)	4	
Frail Care: 0,5 bays per bedroom (32 bedrooms)	16	
Private Outdoor Space:		
50m² provision per unit (excl roads)	XXXX per erf	

PLAN 3

STILL BAY ERF 4784

SUBDIVISION PLAN

LEGEND

ZONING:		QTY	AREA (ha)	%
	General Residential Zone III	129	3.8394	71.25
	Open Space Zone II	1	1.8682	7.05
TOTAL		130	5.7076	100

NOTES

1. Sizes and dimensions are approximate and subject to final survey.
2. For erf data, refer SG 2258/2018
3. The line ab represents a new 7m wide services servitude.
4. Maximum Density 35 units per hectare - Proposed Development 20 Units/Hectare
5.

DRAWN:	MV	CHECKED:	MV
PLAN NO:	Pr1915SB4787L01		
PLAN DATE:	28 May 2019		
STORED:	z:\drawings\App\Pr1915SB4787L01.drg		

COPY RIGHT:

This Plan may not be copied or amended without the written consent of M Vreken

It is hereby certified that this subdivision plan (Plan No. _____Pr1206Ph2L01____, has been approved in terms of Sections 60 and 15(2)(d) of the Hessequa Municipal By-law on Municipal Land Use Planning. File reference [____XXXX_____]. as published in P.N. 7472/2015 ON 21 AUGUST 2015

____
MUNICIPAL MANAGER

DATE: ___________________________

Marike Vreken
URBAN & ENVIRONMENTAL PLANNERS
STADS & OMGEWINGSBEPLANNERS
21 Trotter Street, PO Box 2180
KNYSNA 6570
' (044) 382 0420
7 086 459 2987
e-mail: marike@vreken.co.za
www.vreken.co.za

ANNEXURE C
RAW TRAFFIC COUNT DATA

Verkeerstelling/Traffic Count

Projek Naam: Stilbaai
Plek/Location: Jongensfontein afrit
Datum/Date: 25-Jul-19
Teller/Counter:

Tyd	1		2		3		4		5		6	
	L	S	L	S	L	S	L	S	L	S	L	S
06:00 - 06:15	0	0	4	2	0	0	1	0	0	0	0	0
06:15 - 06:30	1	0	13	2	0	0	1	0	0	0	1	0
06:30 - 06:45	2	0	19	3	0	0	1	0	0	0	1	0
06:45 - 07:00	11	0	28	6	0	0	4	0	0	0	1	0
07:00 - 07:15	28	1	70	8	0	0	7	0	1	0	1	0
07:15 - 07:30	42	1	114	9	0	0	13	0	1	0	3	0
07:30 - 07:45	61	1	162	11	0	0	15	0	1	0	4	0
07:45 - 08:00	71	2	186	13	0	0	20	0	2	0	4	0
08:00 - 08:15	91	6	215	15	1	0	21	0	2	0	4	0
08:15 - 08:30	100	6	245	16	1	0	25	0	2	0	4	0
08:30 - 08:45	110	7	280	19	1	0	30	0	2	0	5	0
08:45 - 09:00	120	9	318	20	1	0	33	0	2	0	6	0
09:00 - 09:15	133	12	355	21	1	0	34	0	2	0	8	0
09:15 - 09:30	141	12	382	22	1	0	38	0	2	0	8	0
09:30 - 09:45	152	12	410	24	1	0	45	0	2	0	8	0
09:45 - 10:00	165	13	437	25	1	0	48	0	2	0	8	0
10:00 - 10:15	174	15	472	27	1	0	52	0	2	0	8	0
10:15 - 10:30	187	15	525	32	1	0	58	1	2	0	9	0
10:30 - 10:45	196	15	585	32	3	0	66	1	2	0	9	0
10:45 - 11:00	203	15	619	33	3	1	69	2	2	0	10	0
11:00 - 11:15	214	16	660	33	3	1	73	2	3	1	10	1
11:15 - 11:30	227	17	695	35	3	1	75	2	4	1	10	1
11:30 - 11:45	241	19	736	36	3	2	79	2	4	1	10	1
11:45 - 12:00	249	20	772	37	3	2	81	2	4	1	13	1

Verkeerstelling/Traffic Count

Projek Naam: Stilbaai
Plek/Location: Jongensfontein afrit
Datum/Date: 25-Jul-19
Teller/Counter:

Tyd	1		2		3		4		5		6	
	L	S	L	S	L	S	L	S	L	S	L	S
12:00 - 12:15	263	23	824	37	3	2	84	2	6	2	14	1
12:15 - 12:30	270	23	859	37	3	2	88	2	6	2	16	1
12:30 - 12:45	288	23	920	39	3	2	90	2	6	3	16	1
12:45 - 13:00	300	23	959	41	3	2	92	2	6	3	17	1
13:00 - 13:15	319	23	1001	41	3	2	97	2	8	3	18	1
13:15 - 13:30	328	23	1023	42	3	2	99	2	9	3	18	1
13:30 - 13:45	349	26	1062	42	3	2	103	2	9	3	18	1
13:45 - 14:00	364	26	1131	43	4	2	111	2	9	3	18	1
14:00 - 14:15	378	26	1180	45	4	2	113	2	10	3	18	1
14:15 - 14:30	404	26	1216	45	4	2	117	2	11	3	19	1
14:30 - 14:45	418	27	1264	48	4	2	121	2	12	3	19	1
14:45 - 15:00	430	27	1303	49	4	2	125	2	12	3	19	1
15:00 - 15:15	443	28	1353	50	5	3	130	2	13	3	22	1
15:15 - 15:30	458	29	1386	50	5	3	134	2	13	3	22	1
15:30 - 15:45	474	30	1429	51	5	3	135	2	15	3	24	1
15:45 - 16:00	488	30	1473	52	5	3	137	2	15	3	24	1
16:00 - 16:15	501	30	1516	55	5	3	137	2	15	3	24	1
16:15 - 16:30	508	31	1558	55	5	3	138	2	15	3	24	1
16:30 - 16:45	525	31	1608	55	5	3	141	2	16	4	26	1
16:45 - 17:00	545	31	1648	55	5	3	142	2	16	4	26	1
17:00 - 17:15	569	31	1700	55	5	3	146	2	16	4	28	1
17:15 - 17:30	588	31	1743	55	6	3	150	2	17	4	29	1
17:30 - 17:45	598	31	1777	55	7	3	154	2	17	4	29	1
17:45 - 18:00	606	31	1812	55	7	3	155	2	17	4	30	1

Verkeerstelling/Traffic Count

Projek Naam: Stilbaai
Plek/Location: Jongensfontein afrit
Datum/Date: 25-Jul-19
Teller/Counter:

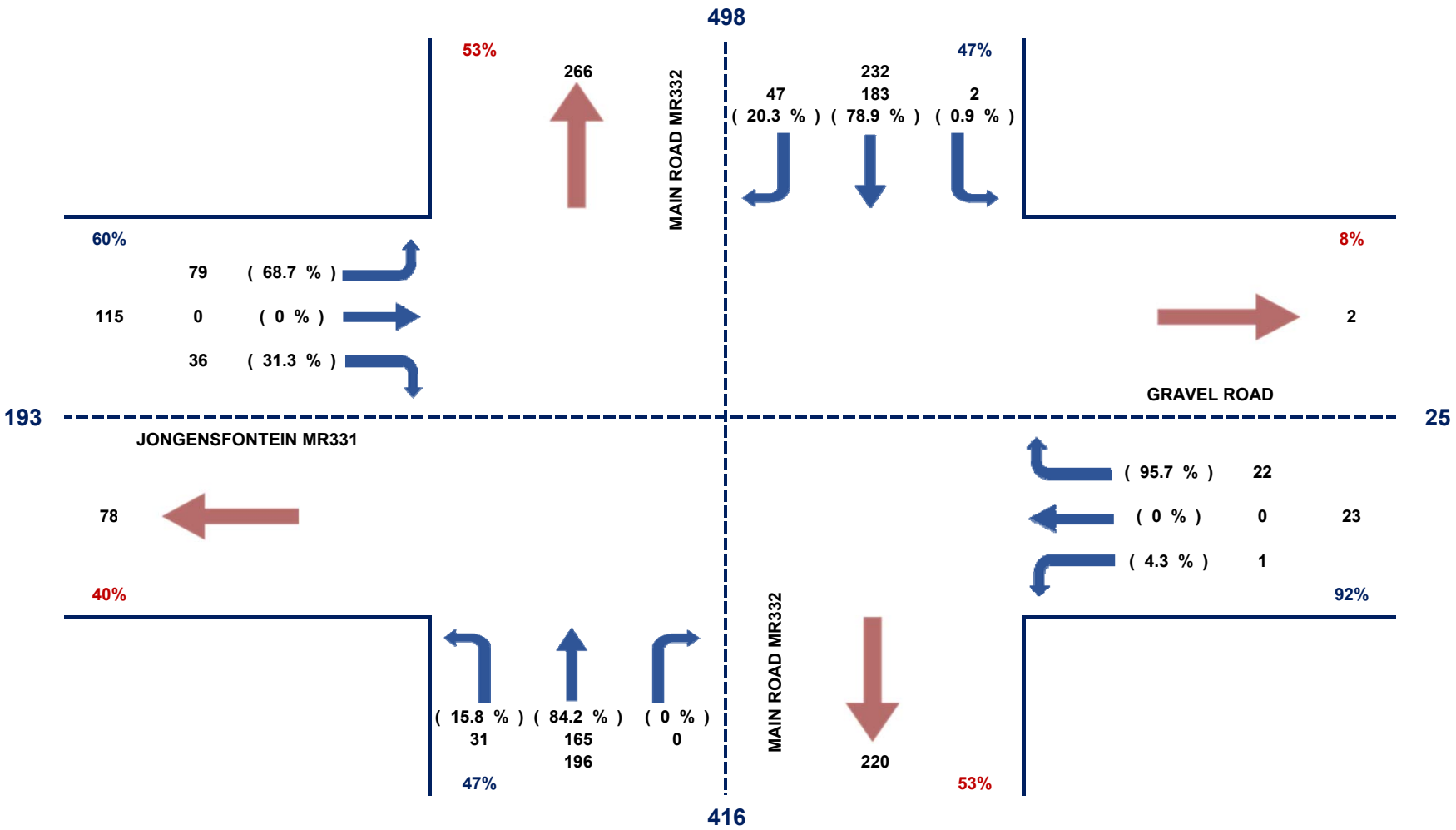
Tyd	7		8		9		10		11		12	
	L	S	L	S	L	S	L	S	L	S	L	S
06:00 - 06:15	0	0	14	0	0	0	0	0	0	0	4	0
06:15 - 06:30	0	0	20	1	0	0	0	0	0	0	7	0
06:30 - 06:45	0	0	33	2	0	0	0	0	0	0	14	0
06:45 - 07:00	0	0	55	5	2	0	1	0	1	0	29	0
07:00 - 07:15	0	0	83	7	7	0	8	0	1	0	53	0
07:15 - 07:30	0	0	107	7	8	0	12	0	1	0	77	0
07:30 - 07:45	0	0	138	9	13	1	22	0	1	0	91	0
07:45 - 08:00	0	0	180	11	14	1	25	0	1	0	117	1
08:00 - 08:15	1	0	219	14	16	1	33	0	1	0	135	1
08:15 - 08:30	1	0	245	16	22	1	40	0	1	0	148	2
08:30 - 08:45	1	0	299	20	27	2	47	0	1	0	166	5
08:45 - 09:00	1	0	332	22	33	2	51	0	1	0	189	7
09:00 - 09:15	1	0	361	23	40	2	55	0	1	0	202	7
09:15 - 09:30	1	0	396	24	45	2	62	0	1	0	221	8
09:30 - 09:45	1	0	448	24	52	3	70	0	1	0	241	10
09:45 - 10:00	1	0	492	25	60	3	74	0	1	0	255	11
10:00 - 10:15	1	0	532	27	65	3	80	0	1	0	282	12
10:15 - 10:30	1	0	563	30	71	3	91	0	1	0	306	1
10:30 - 10:45	1	0	606	31	83	3	105	1	1	0	317	13
10:45 - 11:00	1	0	647	31	88	3	114	1	1	0	329	13
11:00 - 11:15	1	0	681	32	92	3	120	1	1	0	348	14
11:15 - 11:30	1	0	708	32	94	3	124	1	1	0	360	14
11:30 - 11:45	1	0	758	33	103	4	133	1	1	0	369	17
11:45 - 12:00	1	0	794	33	108	4	138	1	1	0	379	17

Verkeerstelling/Traffic Count

Projek Naam: Stilbaai
Plek/Location: Jongensfontein afrit
Datum/Date: 25-Jul-19
Teller/Counter:

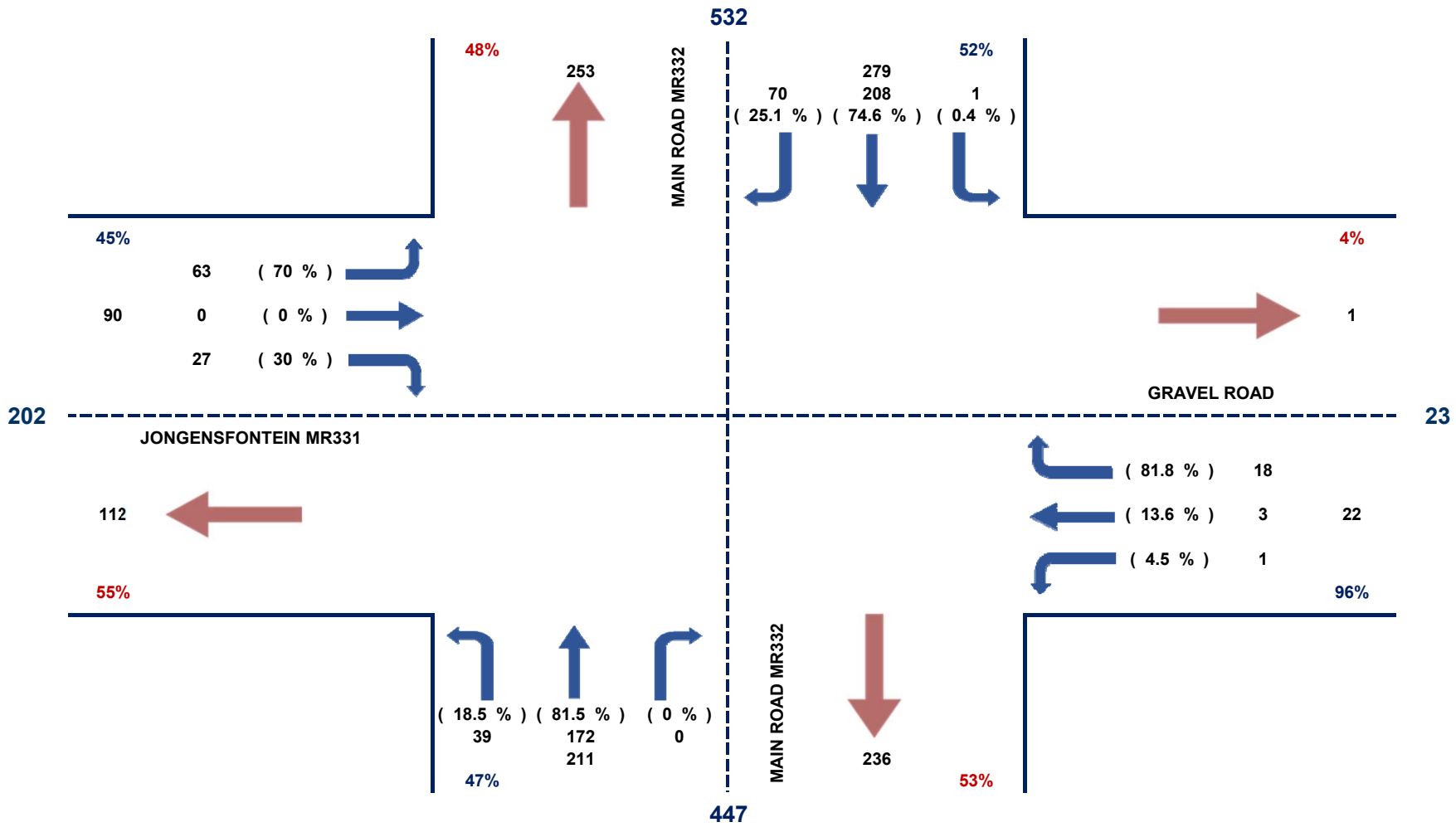
Tyd	7		8		9		10		11		12	
	L	S	L	S	L	S	L	S	L	S	L	S
12:00 - 12:15	1	0	841	34	117	4	153	1	1	0	394	18
12:15 - 12:30	1	0	862	34	123	4	160	2	1	0	399	19
12:30 - 12:45	1	0	924	34	128	4	172	2	1	0	417	19
12:45 - 13:00	1	0	965	36	147	4	177	2	1	0	429	20
13:00 - 13:15	1	0	1021	38	153	4	181	2	1	0	450	21
13:15 - 13:30	1	0	1047	38	160	4	183	2	1	0	462	21
13:30 - 13:45	1	0	1082	38	161	4	185	2	1	0	478	21
13:45 - 14:00	1	0	1136	39	170	5	188	3	1	0	490	23
14:00 - 14:15	1	0	1174	40	177	5	195	3	1	0	509	24
14:15 - 14:30	1	0	1210	41	189	5	206	4	1	0	527	25
14:30 - 14:45	1	0	1250	42	199	5	210	4	1	0	536	26
14:45 - 15:00	1	0	1290	44	213	5	214	4	1	0	557	28
15:00 - 15:15	1	0	1346	44	224	5	215	4	1	0	567	28
15:15 - 15:30	1	0	1380	45	232	5	222	4	1	0	585	28
15:30 - 15:45	1	0	1435	47	240	5	230	4	1	0	598	30
15:45 - 16:00	1	0	1473	47	245	5	245	4	1	0	617	31
16:00 - 16:15	1	0	1502	48	259	5	254	4	1	0	626	31
16:15 - 16:30	1	0	1530	49	263	5	269	4	1	0	639	32
16:30 - 16:45	2	0	1582	49	272	5	281	4	1	0	656	35
16:45 - 17:00	3	0	1627	49	276	5	295	4	1	0	669	35
17:00 - 17:15	3	0	1652	50	282	5	305	4	1	0	688	37
17:15 - 17:30	3	0	1686	50	286	5	314	4	1	0	702	38
17:30 - 17:45	3	0	1714	51	295	5	319	4	1	0	715	38
17:45 - 18:00	3	0	1734	51	298	5	325	4	1	0	718	38

OGGEND SPITS: VANAF **09h45** **TOT** **10h45** **DATUM:** **25 JULIE 2019**



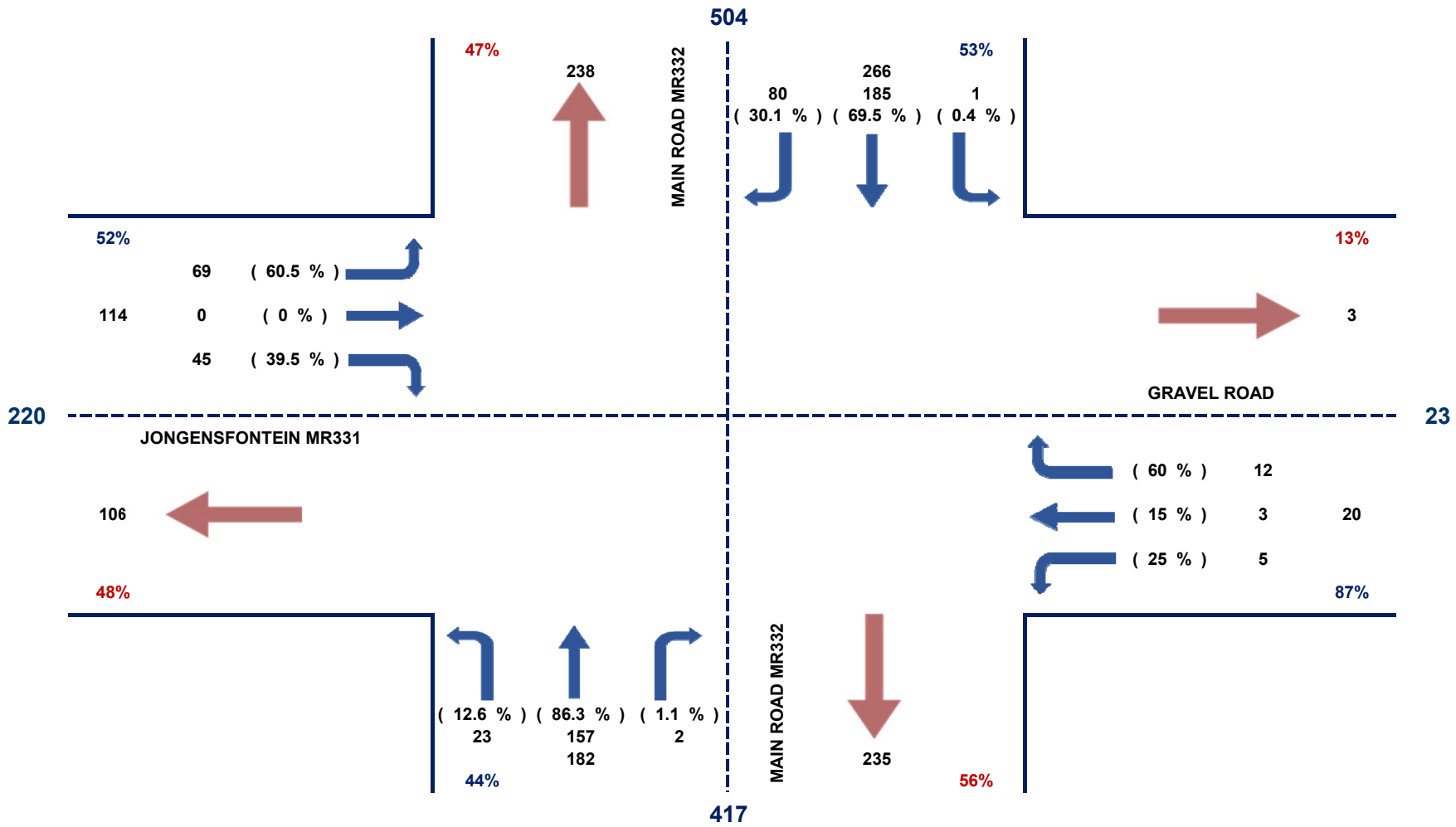
STILBAAI AFTREE OORD

MIDDAG SPITS: VANAF **13h45** **TOT** **14h45** **DATUM:** **25 JULIE 2019**



STILBAAI AFTREE OORD

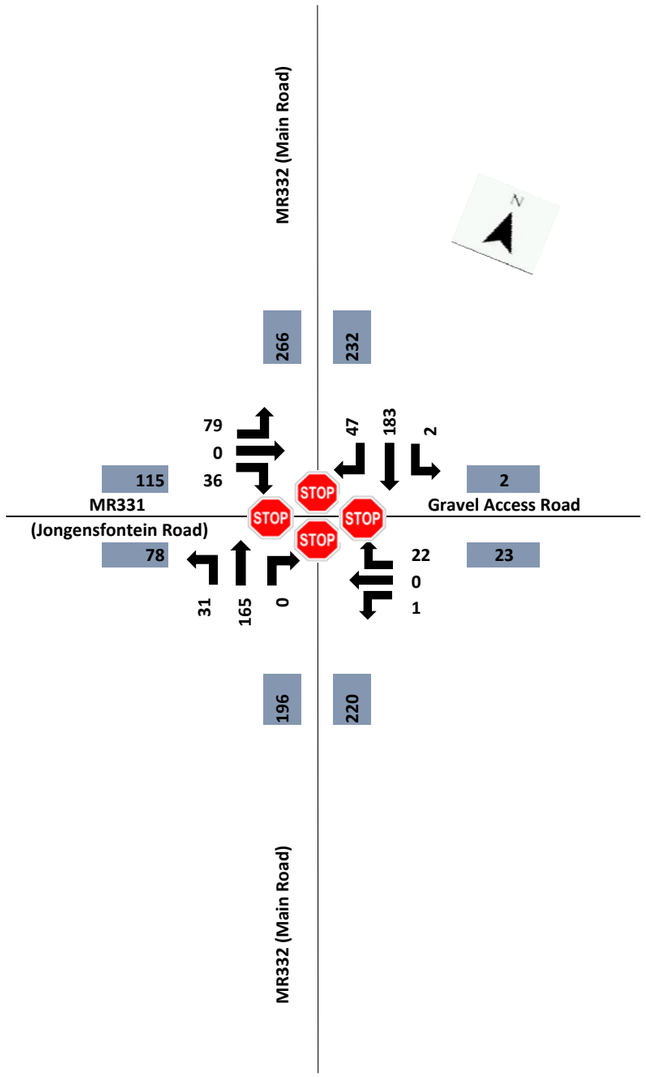
NAMIDDAG SPITS: VANAF **16h30** **TOT** **17h30** **DATUM:** **25 JULIE 2019**



STILBAAI AFTREE OORD

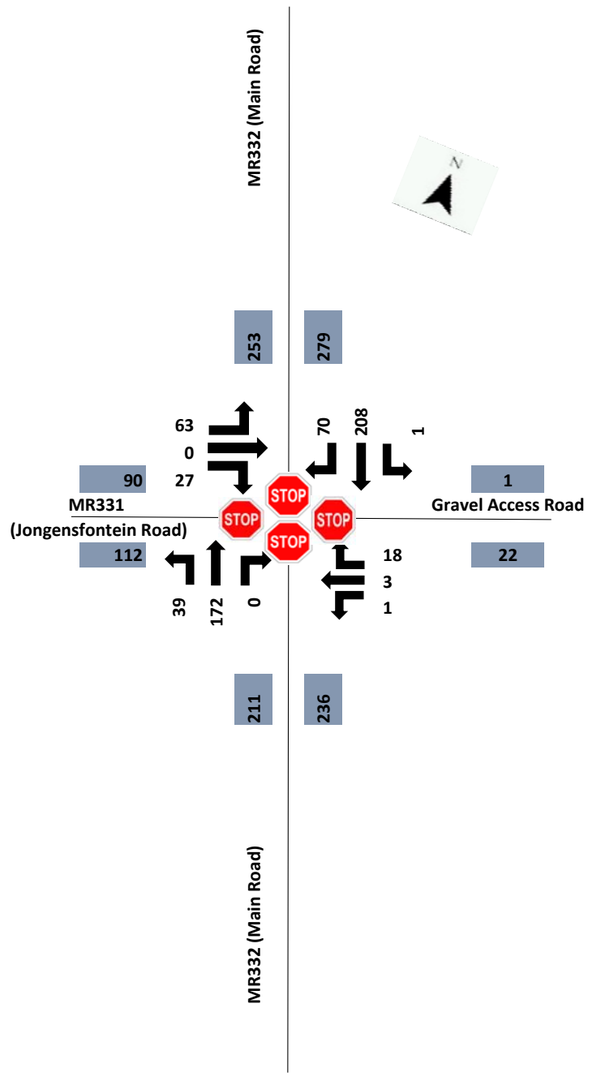
ANNEXURE D
ANALYSED TRAFFIC VOLUME DATA

AM PEAK HOUR PERIOD



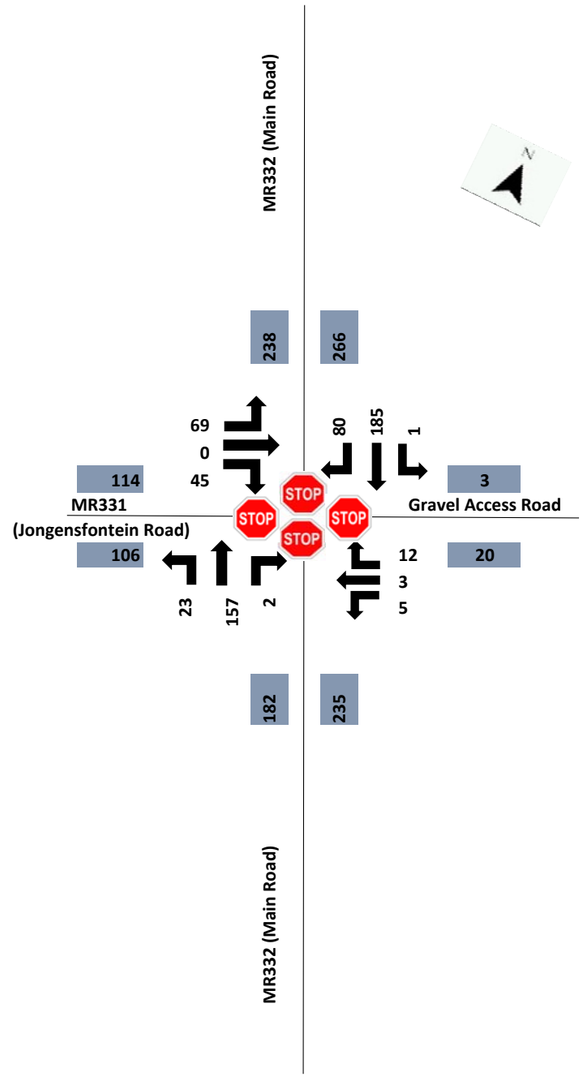
09:45 to 10:45

NM PEAK HOUR PERIOD



13:45 to 14:45

PM PEAK HOUR PERIOD



16:30 to 17:30

URBAN ENGINEERING

Project:

STILLBAAI TIA

Description:

2019 PEAK HOUR TRAFFIC VOLUMES

Legend:

Stop Controlled Approach

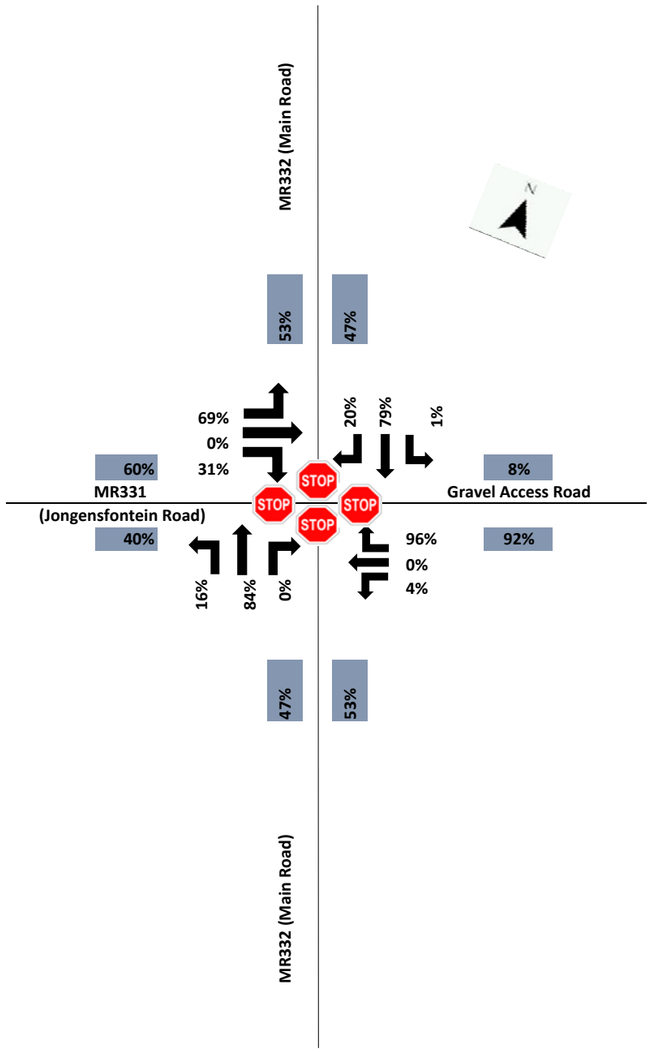
Peak Hour Volumes

Total Volume

Title

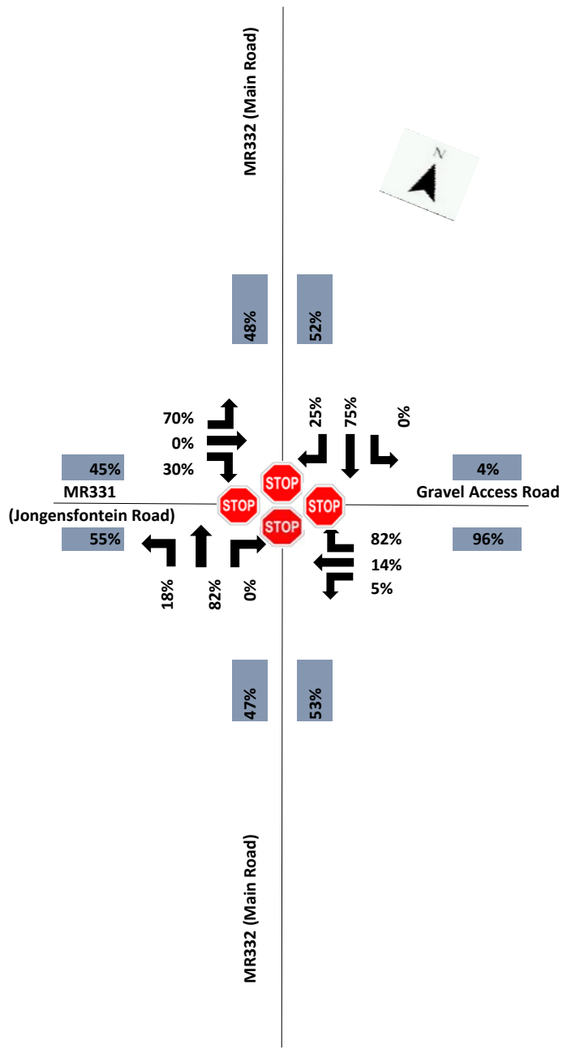
FIGURE A

AM PEAK HOUR PERIOD



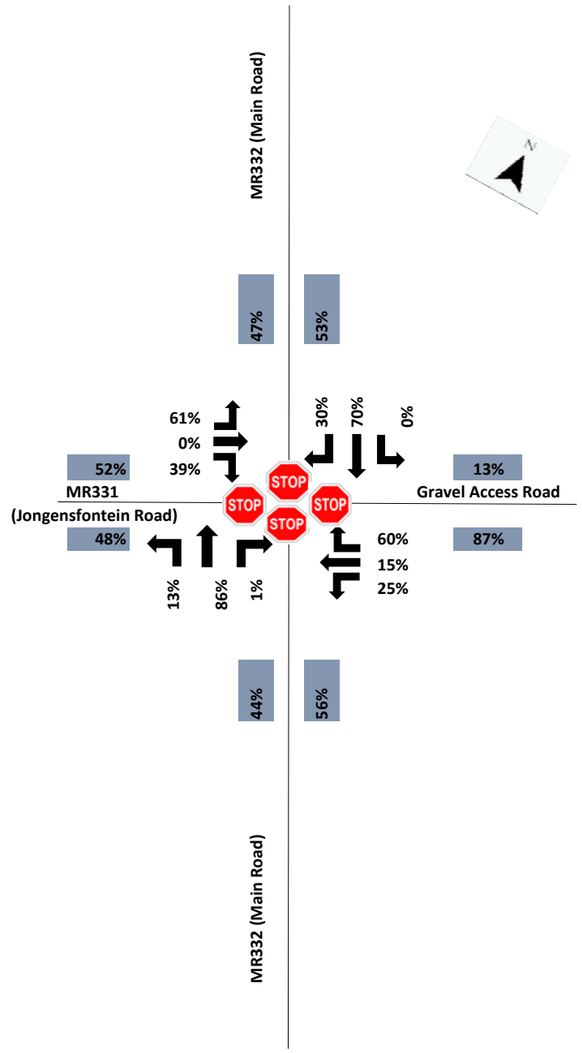
09:45 to 10:45

NM PEAK HOUR PERIOD



13:45 to 14:45

PM PEAK HOUR PERIOD



16:30 to 17:30

URBAN ENGINEERING

Project:

STILLBAAI TIA

Description:

2019 PEAK HOUR TRAFFIC DISTRIBUTION

Legend:

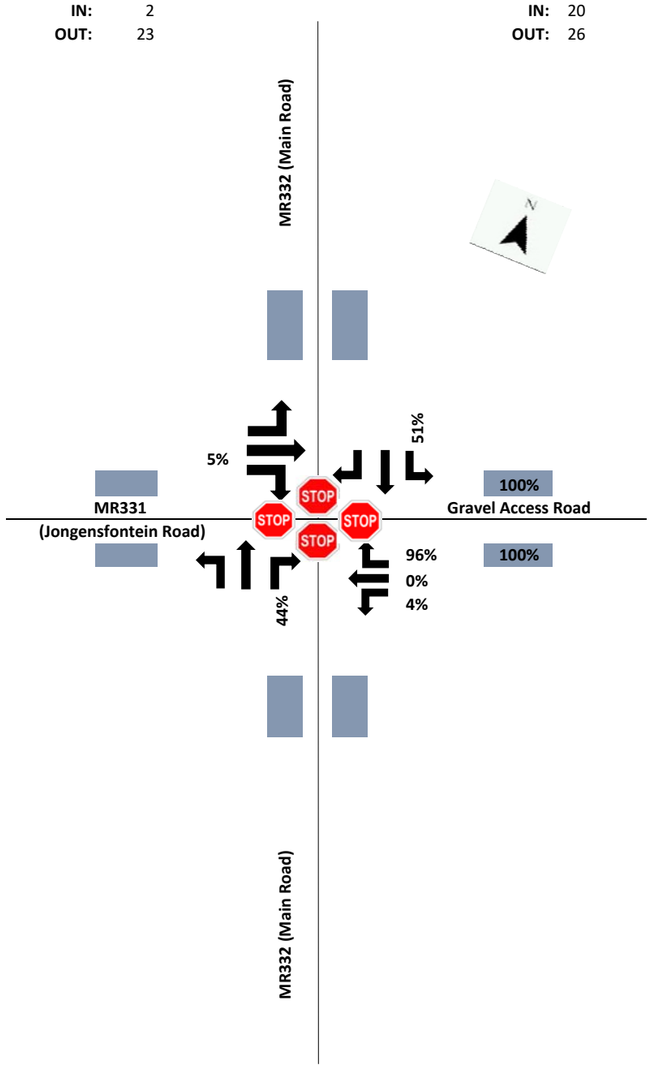
- STOP — **Stop Controlled Approach**
- **Peak Hour Volumes**
- **Total Volume**

Title

FIGURE B

AM PEAK HOUR PERIOD

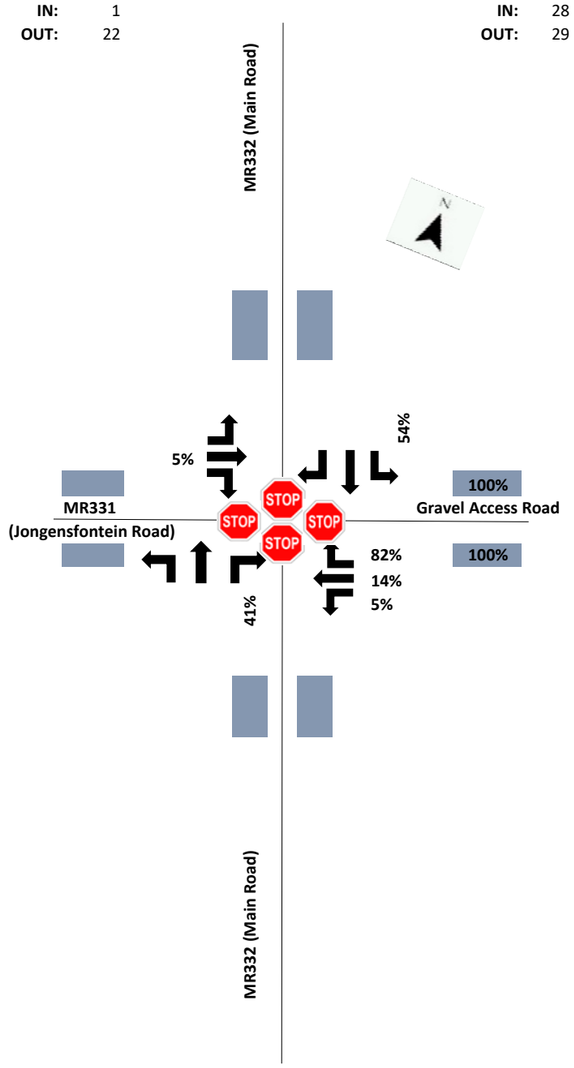
ACTUAL		NEW	
IN:	2	IN:	20
OUT:	23	OUT:	26



09:45 to 10:45

NM PEAK HOUR PERIOD

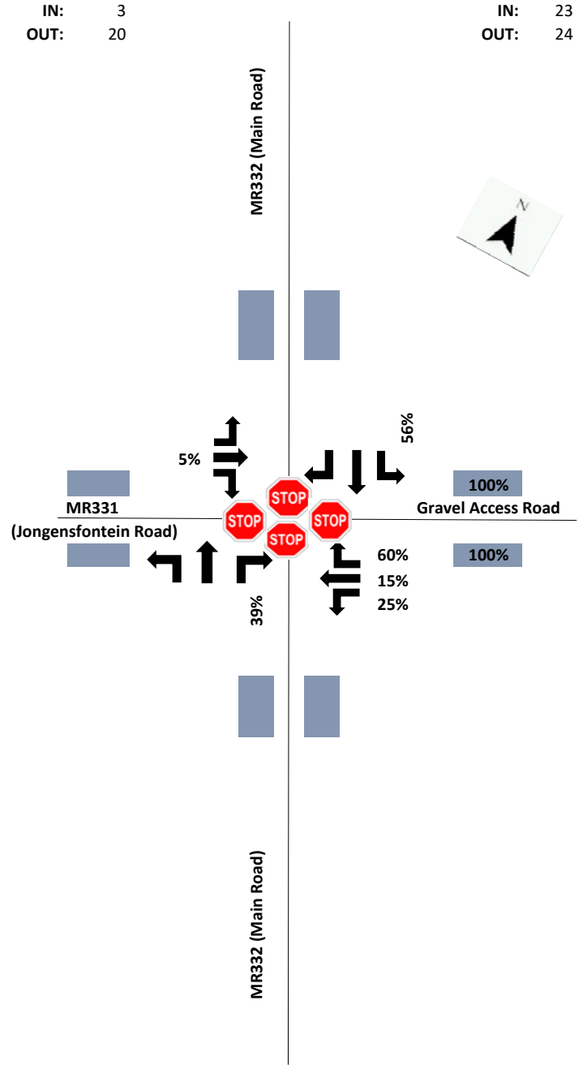
ACTUAL		NEW	
IN:	1	IN:	28
OUT:	22	OUT:	29



13:45 to 14:45

PM PEAK HOUR PERIOD

ACTUAL		NEW	
IN:	3	IN:	23
OUT:	20	OUT:	24



16:30 to 17:30

URBAN ENGINEERING

Project:

STILLBAAI TIA

Description:

ASSUMED DISTRIBUTION % OF GENERATED TRAFFIC

Legend:

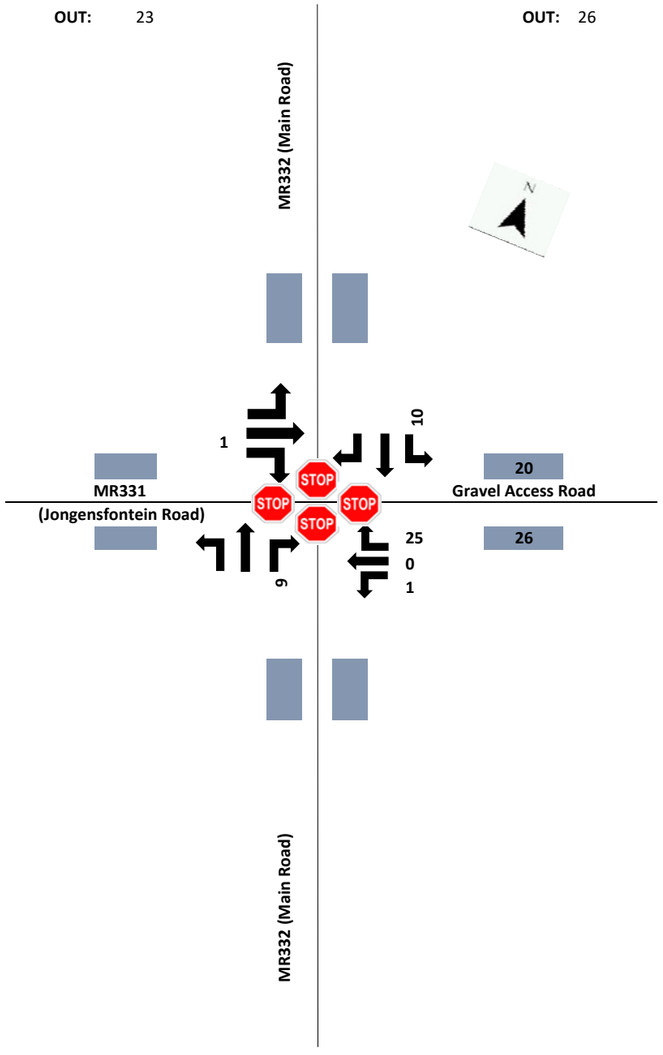
- STOP — **Stop Controlled Approach**
- **Peak Hour Volumes**
- **Total Volume**

Title

FIGURE C

AM PEAK HOUR PERIOD

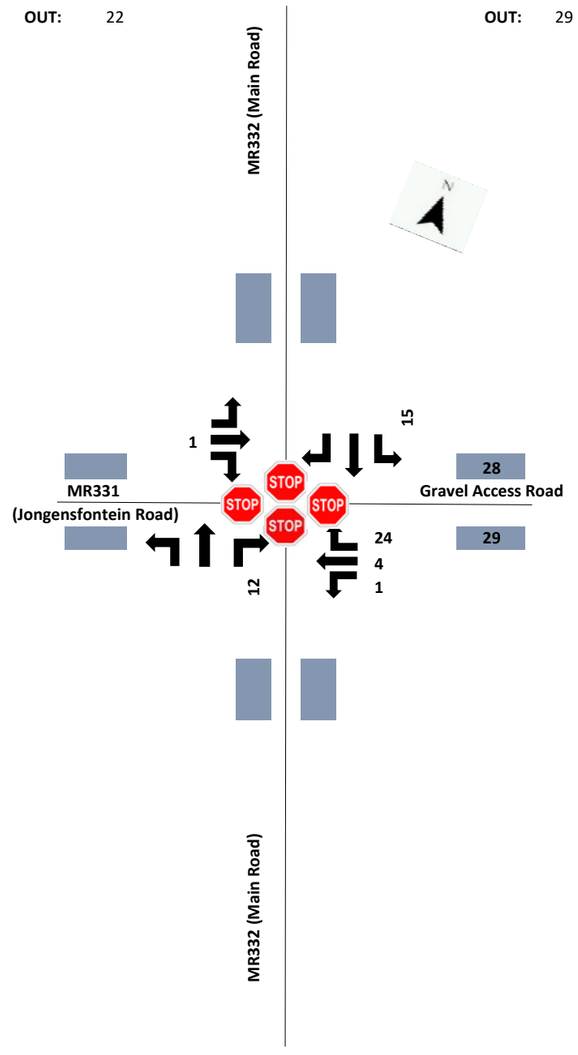
ACTUAL		NEW	
IN:	2	IN:	20
OUT:	23	OUT:	26



09:45 to 10:45

NM PEAK HOUR PERIOD

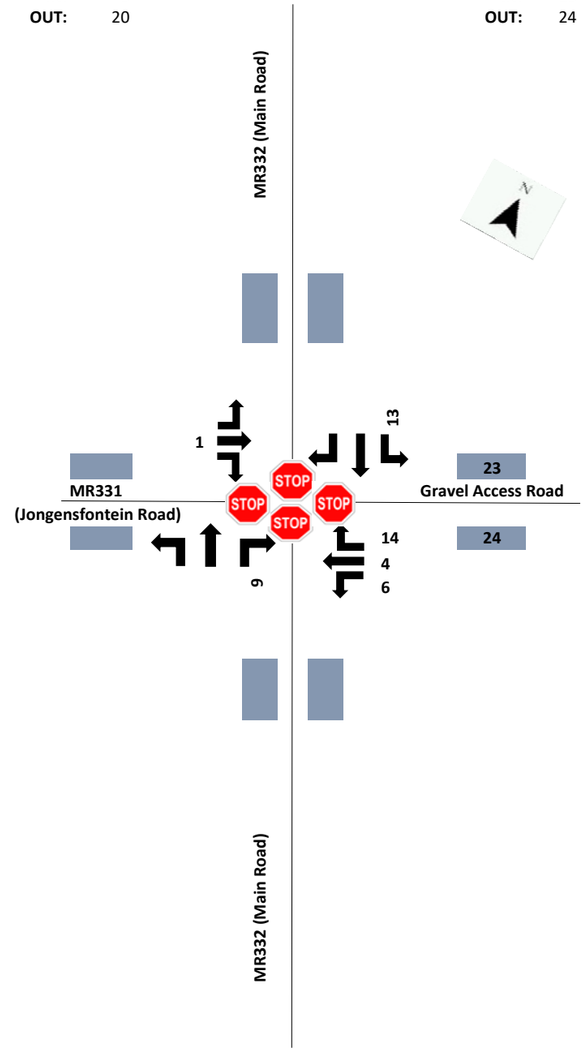
ACTUAL		NEW	
IN:	1	IN:	28
OUT:	22	OUT:	29



13:45 to 14:45

PM PEAK HOUR PERIOD

ACTUAL		NEW	
IN:	3	IN:	23
OUT:	20	OUT:	24



16:30 to 17:30

URBAN ENGINEERING

Project:

STILLBAAI TIA

Description:

ASSUMED GENERATED TRAFFIC DISTRIBUTION VOLUMES

Legend:

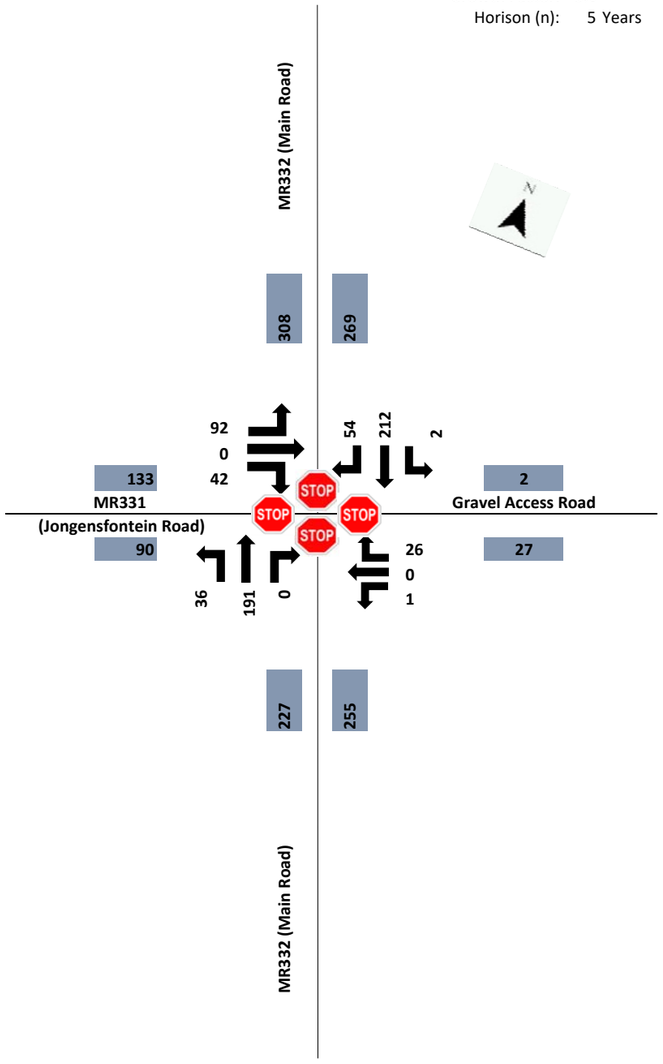
- STOP — **Stop Controlled Approach**
- **Peak Hour Volumes**
- **Total Volume**

Title

FIGURE D

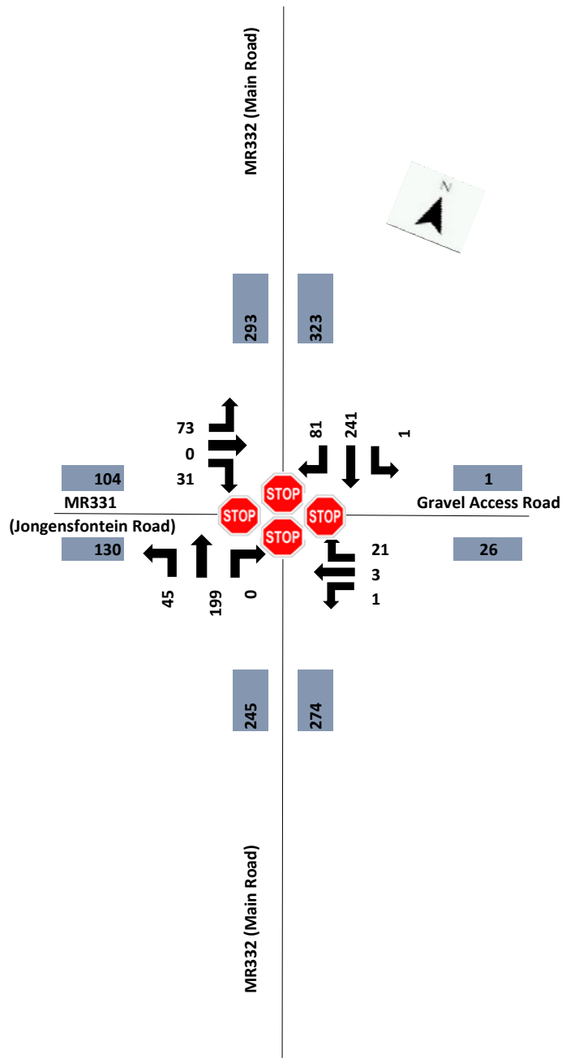
AM PEAK HOUR PERIOD

Growth Factor: 3%
Horison (n): 5 Years



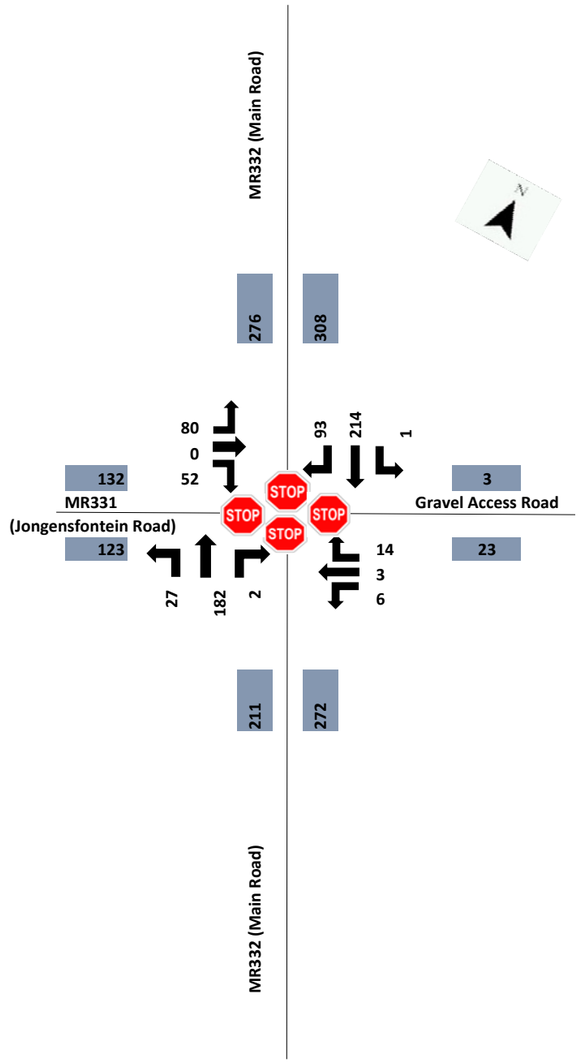
09:45 to 10:45

NM PEAK HOUR PERIOD



13:45 to 14:45

PM PEAK HOUR PERIOD



16:30 to 17:30

URBAN ENGINEERING

Project:

STILLBAAI TIA

Description:

2024 FUTURE BACKGROUND TRAFFIC

Legend:

Stop Controlled Approach

Peak Hour Volumes

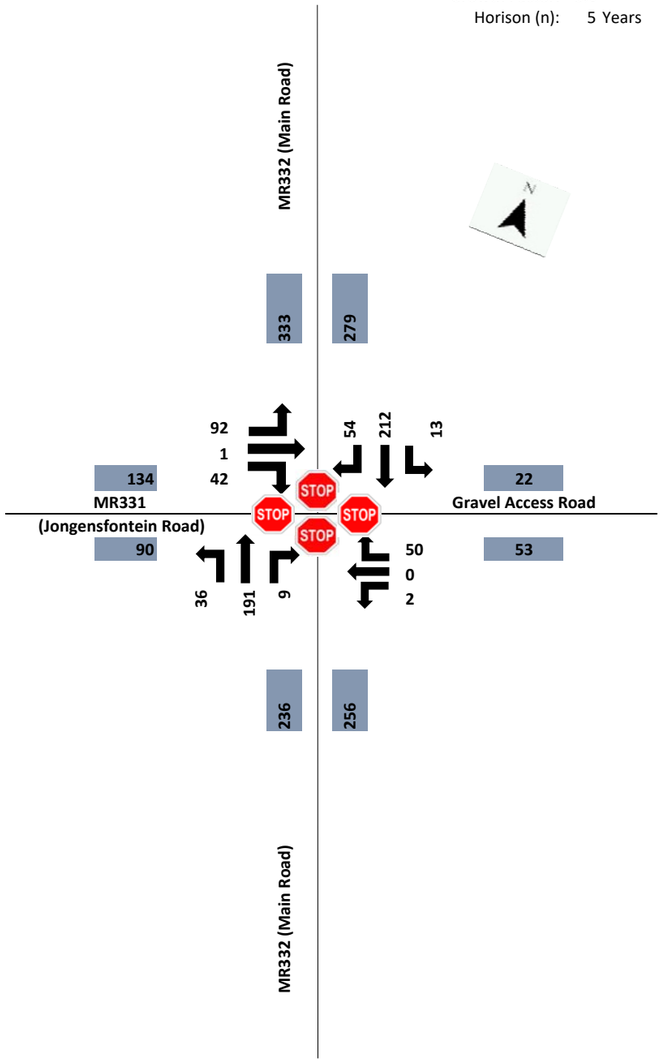
Total Volume

Title

FIGURE E

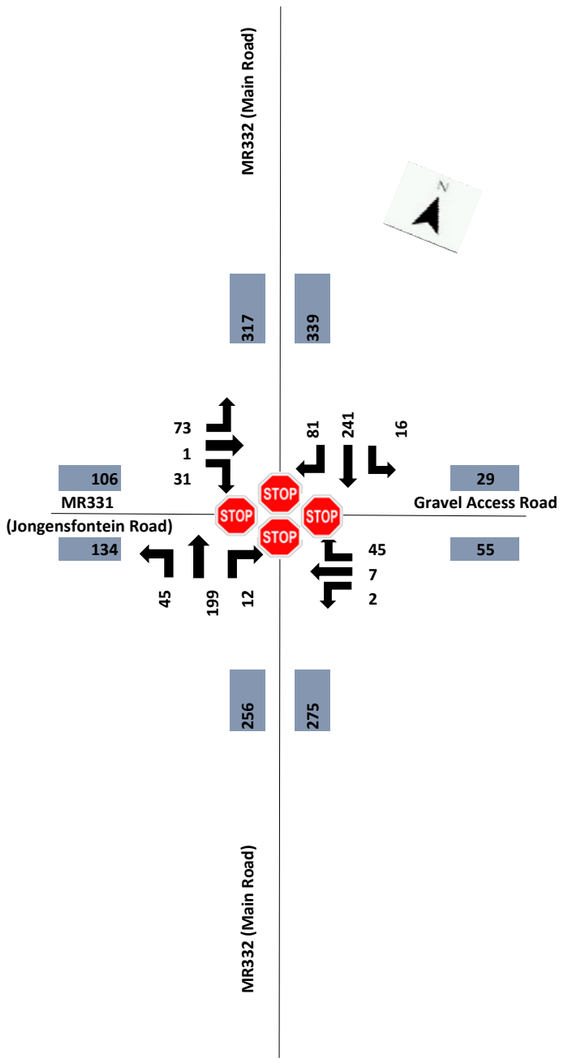
AM PEAK HOUR PERIOD

Growth Factor: 3%
Horison (n): 5 Years



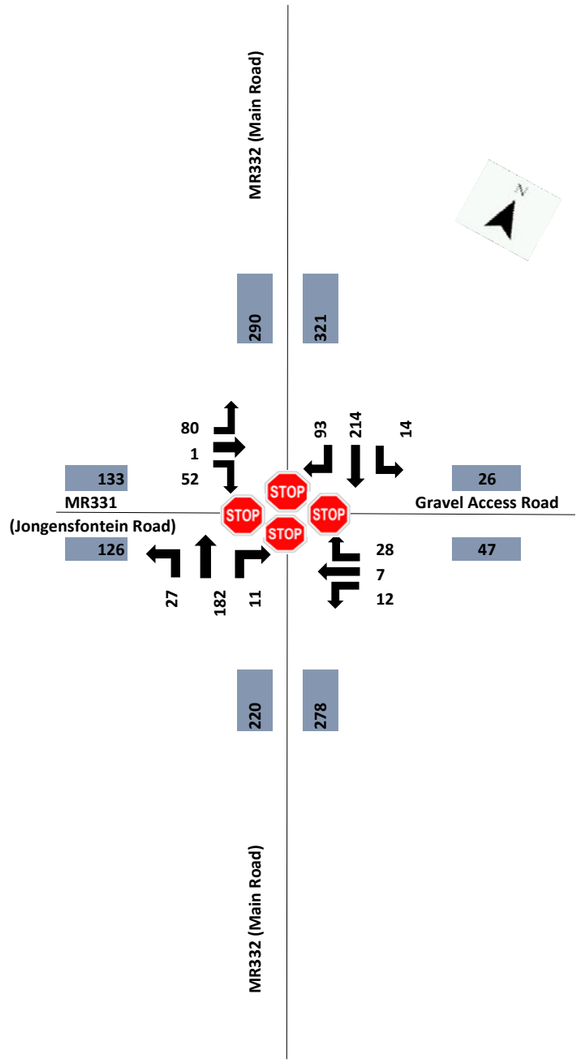
09:45 to 10:45

NM PEAK HOUR PERIOD



13:45 to 14:45

PM PEAK HOUR PERIOD



16:30 to 17:30

URBAN ENGINEERING

Project:

STILLBAAI TIA

Description:

2024 BACKGROUND + GENERATED TRAFFIC

Legend:

Stop Controlled Approach

Peak Hour Volumes

Total Volume

Title

FIGURE F

ANNEXURE E
TRIP GENERATION SPREADSHEET

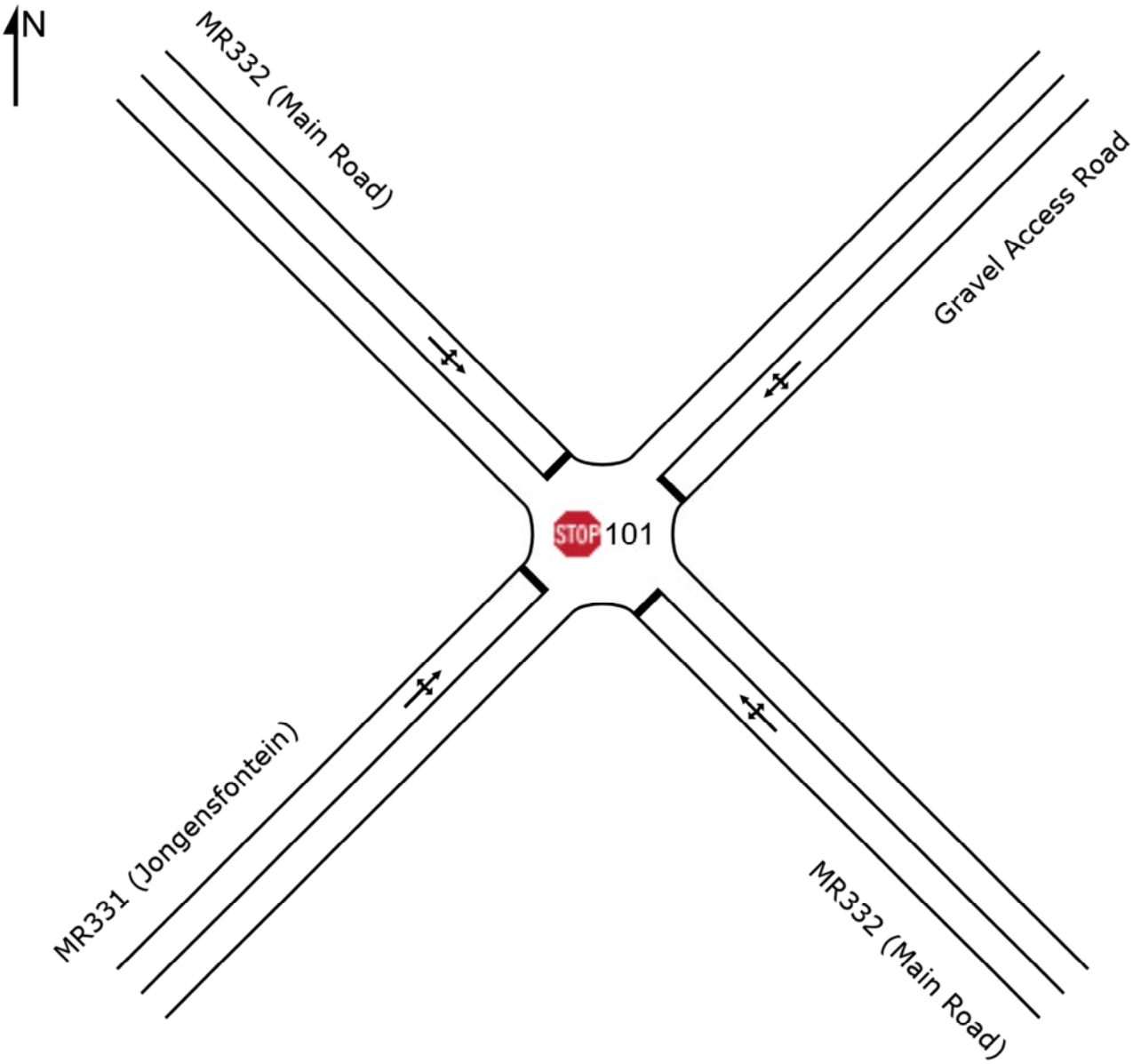
Development	Size/Number of Units	Unit	AM Peak	PM Peak	Friday PM	Midday	Evening	Saturday	Sunday	Size Adj. Factor	Mixed-Use Development?	Low Car Ownership?	Very Low Car Ownership?	Transit Nodes / Corridors?	Adjustment Factor 1	Adjustment Factor 2	Adjustment Factor 3	Adjustment Factor 4	Total Adjustment Factor	AM Peak	PM Peak	Friday PM	Midday	Evening	Saturday	Sunday
Service Industry		100 m² GLA	0.9	0.9		0.9		0.15		1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Heavy Industry/Manufacturing		100 m² GLA	0.5	0.7						1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Mining		1 Employee								1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Industrial Area (Park)		100 m² GLA	0.8	0.8				0.4		1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Manufacturing		100 m² GLA	0.6	0.6				0.3		1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Warehousing and Distribution		100 m² GLA	0.5	0.5				0.15		1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Mini-Warehousing		100 m² GLA	0.15	0.25				0.4	0.3	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Single Dwelling Units		1 D/Unit	1	1				0.5	0.5	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Apartments and Flats		1 D/Unit	0.65	0.65				0.35	0.35	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Student Apartments and Flats		1 D/Unit	0.2	0.3				0.15	0.15	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Townhouses (Simplexes & Duplexes)		1 D/Unit	0.85	0.85				0.45	0.45	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Multi-Level Townhouses		1 D/Unit	0.75	0.75				0.4	0.4	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Retirement Village	120	1 D/Unit	0.35	0.35		0.4		0.2	0.2	1	N	N	N	N	0	0	0	0	1	42	42	0	48	0	24	24
Old-Age Home	8	1 D/Unit	0.15	0.2		0.35		0.3	0.35	1	N	N	N	N	0	0	0	0	1	1	2	0	3	0	2	3
Recreational Homes		1 D/Unit	0.15	0.25				0.35	0.35	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Hotel, Residential		1 Unit	0.5	0.5		0.25		0.7	0.55	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Hotel, Resort		1 Room	0.3	0.4						1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Guest House		1 Room	0.45	0.45				0.25	0.25	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Golf Course		1 Course	40	50				80	80	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Casino		100 m² GLA	0.85	5		3.25	6.25	3		1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Amusement Park		1 Ha	0.5	10				47	44	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Sport Stadium		1000 Seat		150			270	170		1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Health & Fitness Centre		100 m² GLA	5	9.5						1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Public Primary School		1 Student	0.85	0.3		0.35				1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Public Secondary School		1 Student	0.75	0.25		0.35				1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Private School		1 Student	0.8	0.3		0.35				1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
University/College		1 Student	0.2	0.2		0.25				1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Places of Public Worship (Weekend)		1 Seat	0.05	0.05					0.65	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Places of Public Worship (Weekday)		1 Seat	0.05	0.05						1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Pre-School (Day Care)		1 Student	1	0.8		0.3				1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Cemetery		1 Ha	0.2	0.2		4		8		1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Public Hospital		1 Bed	1.5	1.45		1.5		1	1	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Private Hospital		100 m² GLA	1.65	1.5		1.6	1.7			1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Nursing Home	32	1 Bed	0.2	0.2		0.3		0.4	0.35	1	N	Y	N	N	0	0.5	0	0	0.5	3	3	0	5	0	6	6
Medical Clinic		100 m² GLA	6	6		4.2		7.8		1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Offices		100 m² GLA	2.1	2.1				0.45	0.15	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Home Offices & Undertakings		1 House	6.5	6.5		7				1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Medical Consulting Rooms		100 m² GLA	8	8		8		3.9	0.45	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Business Centre (Park)		100 m² GLA	1.5	1.5						1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Conference Centre		1 Seat	0.5							1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Building Materials		100 m² GLA	2.8		5.5			11	5	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Hardware and Paint Store		100 m² GLA	1.15		5.2			12	10	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Nursery (Garden Centre)		100 m² GLA	1.4	3	4.1			4		1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Shopping Centre		100 m² GLA	0.6		3.4			4.5		7	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Bulk Trade Centre		100 m² GLA	1.1		1.5	0.9		3.9		1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Motor Dealership		100 m² GLA	2.2		2.3	5.1		2.2		1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Furniture Store		100 m² GLA	0.2	2.1	0.5	1.3		2.5	1	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Restaurant, Quality (Sit-Down)		100 m² GLA	0.75	11.8		9.8	9	11	9	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Restaurant, Family (Sit-Down)		100 m² GLA		8			10	20	25	1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Fast Food		100 m² GLA	45	50		30	55			1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Filling Station		1 Station								1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
Vehicle Fitment Centre		100 m² GLA	3	4.3				5.2		1	N	N	N	N	0	0	0	0	1	0	0	0	0	0	0	0
TOTAL TRIPS GENERATED																				46	47	0	56	0	33	32
																					47					

ANNEXURE F
SIDRA ANALYSIS RESULTS

SITE LAYOUT

Site: 101 [2019 AM]

New Site
Site Category: (None)
Stop (All-Way)



SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: URBAN ENGINEERING | Created: Tuesday, September 3, 2019 12:22:17 PM
Project: C:\Users\user\OneDrive - Urban Engineering (Pty) Ltd\Projects\2019-07-09 Stilbaai Aftree Oord\3_Working\SIDRA\Stilbaai.sip8

MOVEMENT SUMMARY

Site: 101 [2019 AM]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	31	0.0	0.274	12.9	LOS B	1.0	6.8	0.74	1.33	2.12	49.7
5	T1	165	0.0	0.274	12.6	LOS B	1.0	6.8	0.74	1.33	2.12	49.5
6	R2	1	0.0	0.274	12.3	LOS B	1.0	6.8	0.74	1.33	2.12	49.2
Approach		197	0.0	0.274	12.6	LOS B	1.0	6.8	0.74	1.33	2.12	49.5
NorthEast: Gravel Access Road												
7	L2	1	0.0	0.076	18.3	LOS C	0.3	1.8	0.92	1.25	2.00	46.4
8	T1	1	0.0	0.076	17.9	LOS C	0.3	1.8	0.92	1.25	2.00	46.2
9	R2	22	0.0	0.076	17.7	LOS C	0.3	1.8	0.92	1.25	2.00	46.0
Approach		24	0.0	0.076	17.7	LOS C	0.3	1.8	0.92	1.25	2.00	46.0
NorthWest: MR332 (Main Road)												
10	L2	2	0.0	0.280	12.1	LOS B	1.0	6.8	0.68	1.34	2.07	50.2
11	T1	183	0.0	0.280	11.7	LOS B	1.0	6.8	0.68	1.34	2.07	50.0
12	R2	47	0.0	0.280	11.5	LOS B	1.0	6.8	0.68	1.34	2.07	49.7
Approach		232	0.0	0.280	11.7	LOS B	1.0	6.8	0.68	1.34	2.07	49.9
SouthWest: MR331 (Jongensfontein)												
1	L2	79	0.0	1.933	1862.3	LOS F	53.8	376.9	1.00	4.30	15.51	1.9
2	T1	1	0.0	1.933	1861.9	LOS F	53.8	376.9	1.00	4.30	15.51	1.9
3	R2	36	0.0	1.933	1861.7	LOS F	53.8	376.9	1.00	4.30	15.51	1.9
Approach		116	0.0	1.933	1862.1	LOS F	53.8	376.9	1.00	4.30	15.51	1.9
All Vehicles		569	0.0	1.933	389.5	LOS F	53.8	376.9	0.78	1.94	4.82	8.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2019 NM]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	39	0.0	0.283	12.7	LOS B	1.0	7.0	0.73	1.34	2.12	49.8
5	T1	172	0.0	0.283	12.4	LOS B	1.0	7.0	0.73	1.34	2.12	49.6
6	R2	1	0.0	0.283	12.1	LOS B	1.0	7.0	0.73	1.34	2.12	49.3
Approach		212	0.0	0.283	12.4	LOS B	1.0	7.0	0.73	1.34	2.12	49.6
NorthEast: Gravel Access Road												
7	L2	1	0.0	0.081	20.4	LOS C	0.3	1.9	0.95	1.25	2.03	45.2
8	T1	3	0.0	0.081	20.0	LOS C	0.3	1.9	0.95	1.25	2.03	45.0
9	R2	18	0.0	0.081	19.8	LOS C	0.3	1.9	0.95	1.25	2.03	44.9
Approach		22	0.0	0.081	19.9	LOS C	0.3	1.9	0.95	1.25	2.03	44.9
NorthWest: MR332 (Main Road)												
10	L2	1	0.0	0.312	11.9	LOS B	1.1	7.7	0.66	1.35	2.11	50.3
11	T1	208	0.0	0.312	11.5	LOS B	1.1	7.7	0.66	1.35	2.11	50.0
12	R2	70	0.0	0.312	11.3	LOS B	1.1	7.7	0.66	1.35	2.11	49.8
Approach		279	0.0	0.312	11.5	LOS B	1.1	7.7	0.66	1.35	2.11	50.0
SouthWest: MR331 (Jongensfontein)												
1	L2	63	0.0	1.517	1147.5	LOS F	38.2	267.1	1.00	1.94	5.13	3.0
2	T1	1	0.0	1.517	1147.1	LOS F	38.2	267.1	1.00	1.94	5.13	3.0
3	R2	27	0.0	1.517	1146.9	LOS F	38.2	267.1	1.00	1.94	5.13	3.0
Approach		91	0.0	1.517	1147.3	LOS F	38.2	267.1	1.00	1.94	5.13	3.0
All Vehicles		604	0.0	1.517	183.2	LOS F	38.2	267.1	0.74	1.43	2.56	14.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2019 PM]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	23	0.0	0.268	13.2	LOS B	1.0	6.7	0.76	1.33	2.13	49.5
5	T1	157	0.0	0.268	12.9	LOS B	1.0	6.7	0.76	1.33	2.13	49.3
6	R2	2	0.0	0.268	12.7	LOS B	1.0	6.7	0.76	1.33	2.13	49.1
Approach		182	0.0	0.268	12.9	LOS B	1.0	6.7	0.76	1.33	2.13	49.3
NorthEast: Gravel Access Road												
7	L2	5	0.0	0.085	22.7	LOS C	0.3	2.0	0.97	1.25	2.06	44.0
8	T1	3	0.0	0.085	22.3	LOS C	0.3	2.0	0.97	1.25	2.06	43.8
9	R2	12	0.0	0.085	22.1	LOS C	0.3	2.0	0.97	1.25	2.06	43.6
Approach		20	0.0	0.085	22.3	LOS C	0.3	2.0	0.97	1.25	2.06	43.8
NorthWest: MR332 (Main Road)												
10	L2	1	0.0	0.319	12.3	LOS B	1.1	8.0	0.69	1.35	2.16	50.0
11	T1	185	0.0	0.319	12.0	LOS B	1.1	8.0	0.69	1.35	2.16	49.8
12	R2	80	0.0	0.319	11.8	LOS B	1.1	8.0	0.69	1.35	2.16	49.6
Approach		266	0.0	0.319	11.9	LOS B	1.1	8.0	0.69	1.35	2.16	49.7
SouthWest: MR331 (Jongensfontein)												
1	L2	69	0.0	0.754	93.1	LOS F	5.8	40.9	1.00	1.81	4.56	23.8
2	T1	1	0.0	0.754	92.7	LOS F	5.8	40.9	1.00	1.81	4.56	23.7
3	R2	45	0.0	0.754	92.5	LOS F	5.8	40.9	1.00	1.81	4.56	23.7
Approach		115	0.0	0.754	92.9	LOS F	5.8	40.9	1.00	1.81	4.56	23.7
All Vehicles		583	0.0	0.754	28.6	LOS D	5.8	40.9	0.78	1.43	2.62	40.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2024 AM]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	36	0.0	0.353	14.3	LOS B	1.4	9.7	0.80	1.37	2.34	48.8
5	T1	191	0.0	0.353	14.0	LOS B	1.4	9.7	0.80	1.37	2.34	48.6
6	R2	9	0.0	0.353	13.8	LOS B	1.4	9.7	0.80	1.37	2.34	48.4
Approach		236	0.0	0.353	14.0	LOS B	1.4	9.7	0.80	1.37	2.34	48.6
NorthEast: Gravel Access Road												
7	L2	2	0.0	0.154	18.4	LOS C	0.5	3.8	0.92	1.27	2.10	46.4
8	T1	1	0.0	0.154	18.0	LOS C	0.5	3.8	0.92	1.27	2.10	46.2
9	R2	50	0.0	0.154	17.8	LOS C	0.5	3.8	0.92	1.27	2.10	46.0
Approach		53	0.0	0.154	17.8	LOS C	0.5	3.8	0.92	1.27	2.10	46.0
NorthWest: MR332 (Main Road)												
10	L2	13	0.0	0.370	13.6	LOS B	1.4	10.1	0.76	1.38	2.34	49.3
11	T1	212	0.0	0.370	13.2	LOS B	1.4	10.1	0.76	1.38	2.34	49.0
12	R2	54	0.0	0.370	13.0	LOS B	1.4	10.1	0.76	1.38	2.34	48.8
Approach		279	0.0	0.370	13.2	LOS B	1.4	10.1	0.76	1.38	2.34	49.0
SouthWest: MR331 (Jongensfontein)												
1	L2	92	0.0	2.207	2339.4	LOS F	68.7	480.8	1.00	4.98	18.52	1.5
2	T1	1	0.0	2.207	2339.1	LOS F	68.7	480.8	1.00	4.98	18.52	1.5
3	R2	42	0.0	2.207	2338.9	LOS F	68.7	480.8	1.00	4.98	18.52	1.5
Approach		135	0.0	2.207	2339.3	LOS F	68.7	480.8	1.00	4.98	18.52	1.5
All Vehicles		703	0.0	2.207	460.5	LOS F	68.7	480.8	0.83	2.06	5.43	7.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2024 NM]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	45	0.0	0.371	14.3	LOS B	1.5	10.3	0.79	1.37	2.38	48.8
5	T1	199	0.0	0.371	14.0	LOS B	1.5	10.3	0.79	1.37	2.38	48.6
6	R2	12	0.0	0.371	13.7	LOS B	1.5	10.3	0.79	1.37	2.38	48.4
Approach		256	0.0	0.371	14.0	LOS B	1.5	10.3	0.79	1.37	2.38	48.6
NorthEast: Gravel Access Road												
7	L2	2	0.0	0.178	20.4	LOS C	0.6	4.5	0.94	1.28	2.16	45.2
8	T1	7	0.0	0.178	20.1	LOS C	0.6	4.5	0.94	1.28	2.16	45.0
9	R2	45	0.0	0.178	19.9	LOS C	0.6	4.5	0.94	1.28	2.16	44.8
Approach		54	0.0	0.178	19.9	LOS C	0.6	4.5	0.94	1.28	2.16	44.9
NorthWest: MR332 (Main Road)												
10	L2	16	0.0	0.419	13.7	LOS B	1.7	12.1	0.75	1.41	2.46	49.2
11	T1	241	0.0	0.419	13.3	LOS B	1.7	12.1	0.75	1.41	2.46	48.9
12	R2	81	0.0	0.419	13.1	LOS B	1.7	12.1	0.75	1.41	2.46	48.7
Approach		338	0.0	0.419	13.3	LOS B	1.7	12.1	0.75	1.41	2.46	48.9
SouthWest: MR331 (Jongensfontein)												
1	L2	73	0.0	1.750	1543.9	LOS F	47.4	332.1	1.00	2.65	8.25	2.3
2	T1	1	0.0	1.750	1543.6	LOS F	47.4	332.1	1.00	2.65	8.25	2.3
3	R2	31	0.0	1.750	1543.3	LOS F	47.4	332.1	1.00	2.65	8.25	2.3
Approach		105	0.0	1.750	1543.7	LOS F	47.4	332.1	1.00	2.65	8.25	2.3
All Vehicles		753	0.0	1.750	227.4	LOS F	47.4	332.1	0.81	1.56	3.22	12.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2024 PM]

New Site
Site Category: (None)
Stop (All-Way)

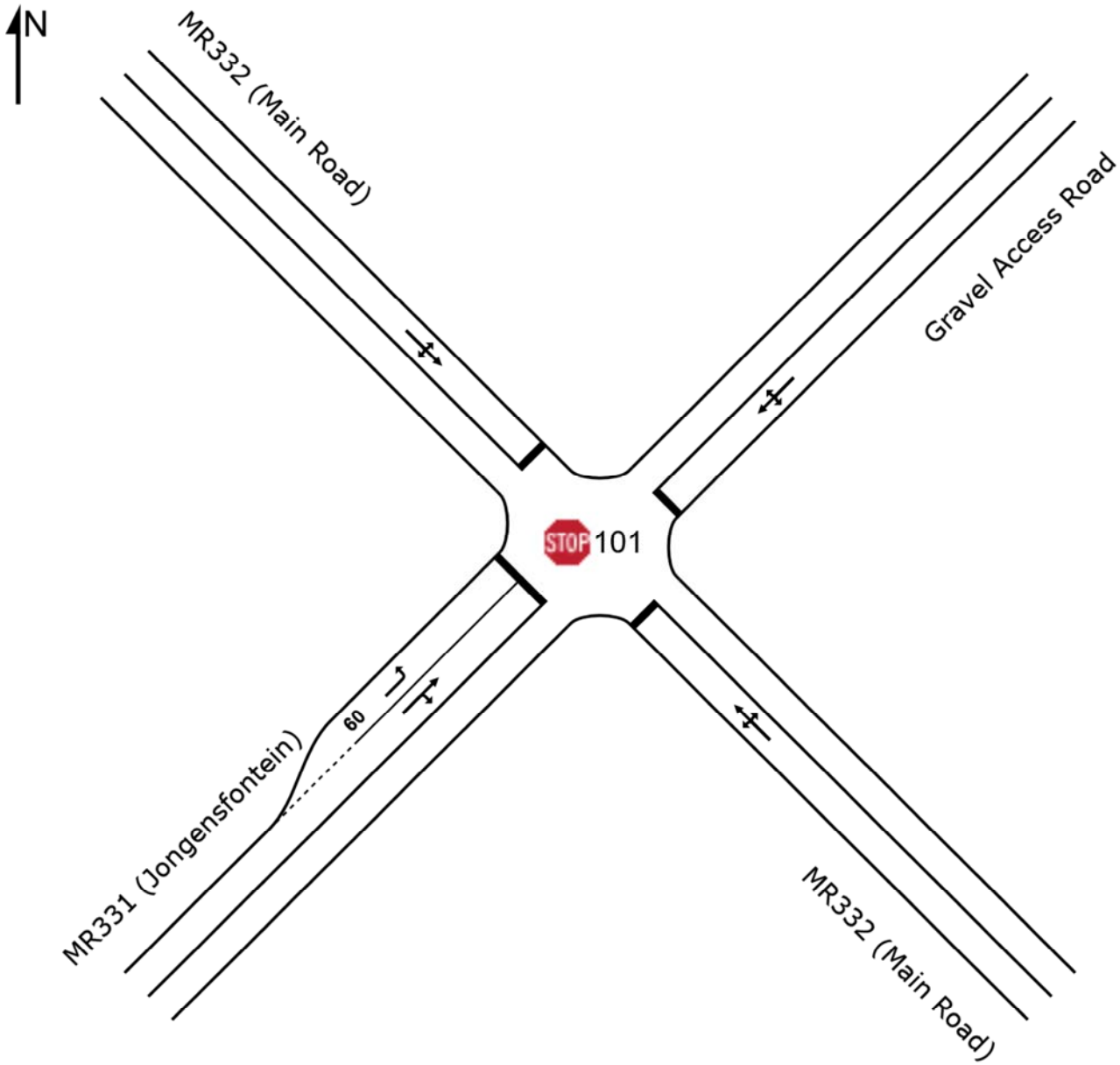
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	27	0.0	0.334	14.2	LOS B	1.3	9.0	0.79	1.36	2.29	48.9
5	T1	182	0.0	0.334	13.9	LOS B	1.3	9.0	0.79	1.36	2.29	48.7
6	R2	11	0.0	0.334	13.6	LOS B	1.3	9.0	0.79	1.36	2.29	48.5
Approach		220	0.0	0.334	13.9	LOS B	1.3	9.0	0.79	1.36	2.29	48.7
NorthEast: Gravel Access Road												
7	L2	12	0.0	0.179	22.7	LOS C	0.7	4.6	0.96	1.28	2.18	44.0
8	T1	7	0.0	0.179	22.4	LOS C	0.7	4.6	0.96	1.28	2.18	43.8
9	R2	28	0.0	0.179	22.2	LOS C	0.7	4.6	0.96	1.28	2.18	43.6
Approach		47	0.0	0.179	22.3	LOS C	0.7	4.6	0.96	1.28	2.18	43.7
NorthWest: MR332 (Main Road)												
10	L2	14	0.0	0.407	13.7	LOS B	1.7	11.6	0.75	1.40	2.43	49.2
11	T1	214	0.0	0.407	13.4	LOS B	1.7	11.6	0.75	1.40	2.43	48.9
12	R2	93	0.0	0.407	13.1	LOS B	1.7	11.6	0.75	1.40	2.43	48.7
Approach		321	0.0	0.407	13.3	LOS B	1.7	11.6	0.75	1.40	2.43	48.9
SouthWest: MR331 (Jongensfontein)												
1	L2	80	0.0	0.794	97.2	LOS F	6.9	48.0	1.00	1.93	5.09	23.2
2	T1	1	0.0	0.794	96.9	LOS F	6.9	48.0	1.00	1.93	5.09	23.1
3	R2	52	0.0	0.794	96.7	LOS F	6.9	48.0	1.00	1.93	5.09	23.1
Approach		133	0.0	0.794	97.0	LOS F	6.9	48.0	1.00	1.93	5.09	23.1
All Vehicles		721	0.0	0.794	29.5	LOS D	6.9	48.0	0.82	1.47	2.86	40.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [2024 AM - RT Lane]

New Site
Site Category: (None)
Stop (All-Way)



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Organisation: URBAN ENGINEERING | Created: Tuesday, September 3, 2019 12:22:42 PM
Project: C:\Users\user\OneDrive - Urban Engineering (Pty) Ltd\Projects\2019-07-09 Stilbaai Aftree Oord\3_Working\SIDRA\Stilbaai.sip8

MOVEMENT SUMMARY

Site: 101 [2024 AM - RT Lane]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	36	0.0	0.353	14.3	LOS B	1.4	9.7	0.80	1.35	2.34	48.7
5	T1	191	0.0	0.353	14.1	LOS B	1.4	9.7	0.80	1.35	2.34	48.6
6	R2	9	0.0	0.353	13.8	LOS B	1.4	9.7	0.80	1.35	2.34	48.2
Approach		236	0.0	0.353	14.1	LOS B	1.4	9.7	0.80	1.35	2.34	48.6
NorthEast: Gravel Access Road												
7	L2	2	0.0	0.217	24.8	LOS C	0.8	5.7	0.98	1.29	2.25	42.9
8	T1	1	0.0	0.217	24.4	LOS C	0.8	5.7	0.98	1.29	2.25	42.7
9	R2	50	0.0	0.217	24.2	LOS C	0.8	5.7	0.98	1.29	2.25	42.6
Approach		53	0.0	0.217	24.2	LOS C	0.8	5.7	0.98	1.29	2.25	42.6
NorthWest: MR332 (Main Road)												
10	L2	13	0.0	0.370	13.6	LOS B	1.4	10.1	0.76	1.36	2.34	49.1
11	T1	212	0.0	0.370	13.3	LOS B	1.4	10.1	0.76	1.36	2.34	49.0
12	R2	54	0.0	0.370	13.3	LOS B	1.4	10.1	0.76	1.36	2.34	48.9
Approach		279	0.0	0.370	13.3	LOS B	1.4	10.1	0.76	1.36	2.34	49.0
SouthWest: MR331 (Jongensfontein)												
1	L2	92	0.0	0.662	66.8	LOS F	4.2	29.5	1.00	1.62	3.74	28.7
2	T1	1	0.0	0.352	35.2	LOS E	1.5	10.6	1.00	1.35	2.52	37.9
3	R2	42	0.0	0.352	35.0	LOS E	1.5	10.6	1.00	1.35	2.52	37.8
Approach		135	0.0	0.662	56.7	LOS F	4.2	29.5	1.00	1.53	3.36	31.1
All Vehicles		703	0.0	0.662	22.7	LOS C	4.2	29.5	0.83	1.38	2.53	43.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2024 NM - RT Lane]

New Site
Site Category: (None)
Stop (All-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	45	0.0	0.371	14.3	LOS B	1.5	10.3	0.79	1.36	2.38	48.7
5	T1	199	0.0	0.371	14.0	LOS B	1.5	10.3	0.79	1.36	2.38	48.6
6	R2	12	0.0	0.371	13.7	LOS B	1.5	10.3	0.79	1.36	2.38	48.3
Approach		256	0.0	0.371	14.1	LOS B	1.5	10.3	0.79	1.36	2.38	48.6
NorthEast: Gravel Access Road												
7	L2	2	0.0	0.265	30.0	LOS D	1.0	7.3	1.00	1.31	2.35	40.4
8	T1	7	0.0	0.265	29.7	LOS D	1.0	7.3	1.00	1.31	2.35	40.3
9	R2	45	0.0	0.265	29.5	LOS D	1.0	7.3	1.00	1.31	2.35	40.1
Approach		54	0.0	0.265	29.5	LOS D	1.0	7.3	1.00	1.31	2.35	40.2
NorthWest: MR332 (Main Road)												
10	L2	16	0.0	0.419	13.7	LOS B	1.7	12.1	0.75	1.39	2.46	49.0
11	T1	241	0.0	0.419	13.4	LOS B	1.7	12.1	0.75	1.39	2.46	48.9
12	R2	81	0.0	0.419	13.5	LOS B	1.7	12.1	0.75	1.39	2.46	48.8
Approach		338	0.0	0.419	13.4	LOS B	1.7	12.1	0.75	1.39	2.46	48.9
SouthWest: MR331 (Jongensfontein)												
1	L2	73	0.0	0.592	61.7	LOS F	3.4	23.5	1.00	1.53	3.32	29.9
2	T1	1	0.0	0.298	35.3	LOS E	1.2	8.6	1.00	1.32	2.41	37.9
3	R2	31	0.0	0.298	35.1	LOS E	1.2	8.6	1.00	1.32	2.41	37.8
Approach		105	0.0	0.592	53.6	LOS F	3.4	23.5	1.00	1.46	3.04	31.9
All Vehicles		753	0.0	0.592	20.4	LOS C	3.4	23.5	0.82	1.38	2.51	44.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2024 PM - RT Lane]

New Site
Site Category: (None)
Stop (All-Way)

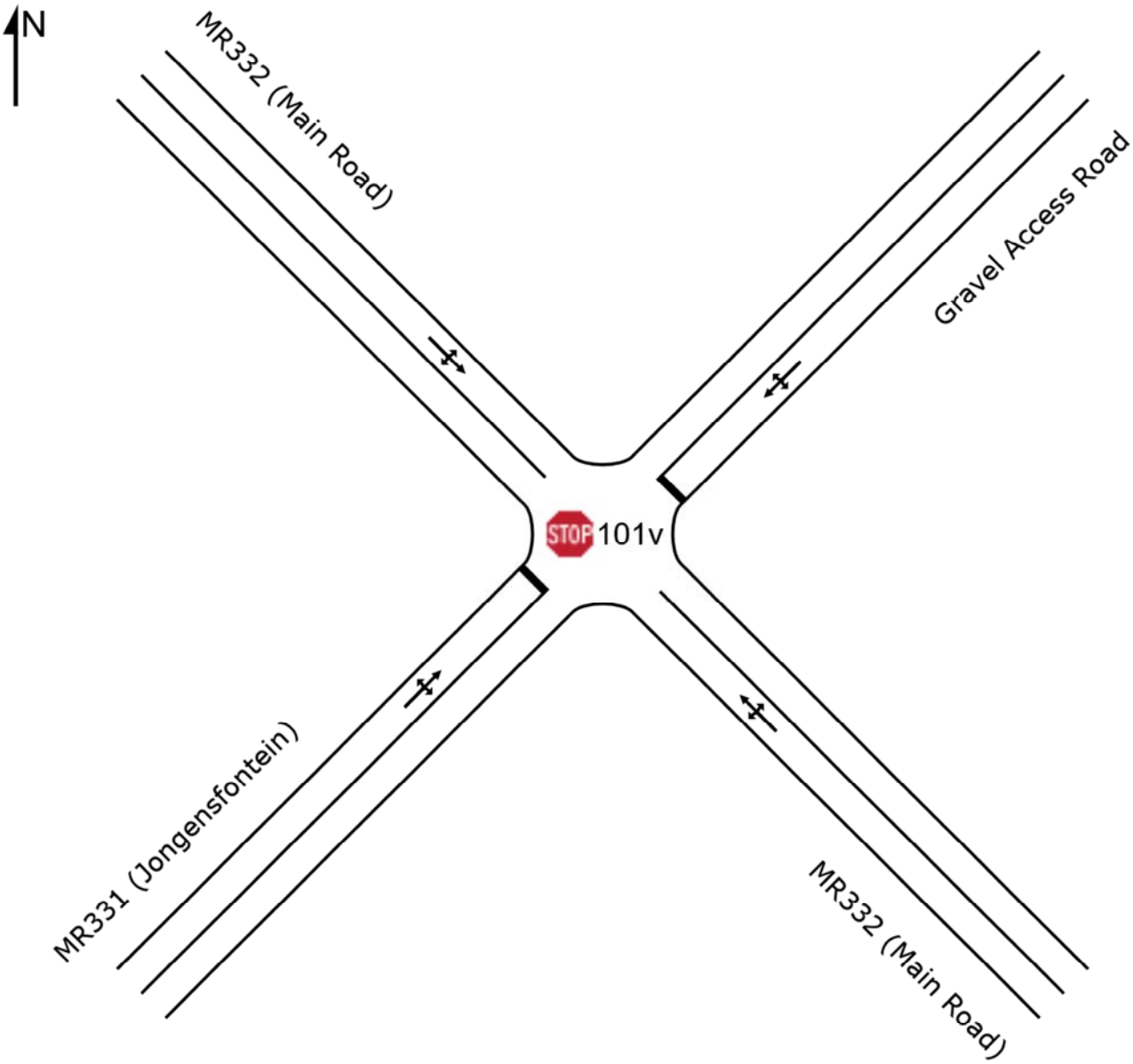
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	27	0.0	0.067	10.8	LOS B	0.2	1.5	0.87	1.24	1.94	51.0
5	T1	182	0.0	0.426	15.7	LOS C	1.9	13.2	0.92	1.40	2.65	47.7
6	R2	11	0.0	0.426	15.5	LOS C	1.9	13.2	0.92	1.40	2.65	47.5
Approach		220	0.0	0.426	15.1	LOS C	1.9	13.2	0.92	1.38	2.57	48.1
NorthEast: Gravel Access Road												
7	L2	12	0.0	0.179	22.7	LOS C	0.7	4.6	0.96	1.28	2.18	43.9
8	T1	7	0.0	0.179	22.4	LOS C	0.7	4.6	0.96	1.28	2.18	43.9
9	R2	28	0.0	0.179	22.2	LOS C	0.7	4.6	0.96	1.28	2.18	43.6
Approach		47	0.0	0.179	22.3	LOS C	0.7	4.6	0.96	1.28	2.18	43.7
NorthWest: MR332 (Main Road)												
10	L2	14	0.0	0.466	15.8	LOS C	2.1	14.7	0.83	1.43	2.69	47.9
11	T1	214	0.0	0.466	15.4	LOS C	2.1	14.7	0.83	1.43	2.69	47.7
12	R2	93	0.0	0.466	15.2	LOS C	2.1	14.7	0.83	1.43	2.69	47.5
Approach		321	0.0	0.466	15.4	LOS C	2.1	14.7	0.83	1.43	2.69	47.7
SouthWest: MR331 (Jongensfontein)												
1	L2	80	0.0	0.794	97.2	LOS F	6.9	48.0	1.00	1.93	5.09	23.2
2	T1	1	0.0	0.794	96.9	LOS F	6.9	48.0	1.00	1.93	5.09	23.1
3	R2	52	0.0	0.794	97.0	LOS F	6.9	48.0	1.00	1.93	5.09	23.1
Approach		133	0.0	0.794	97.1	LOS F	6.9	48.0	1.00	1.93	5.09	23.1
All Vehicles		721	0.0	0.794	30.8	LOS D	6.9	48.0	0.89	1.50	3.06	39.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101v [2024 AM - 2 way stop]

New Site
Site Category: (None)
Stop (Two-Way)



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Organisation: URBAN ENGINEERING | Created: Tuesday, September 3, 2019 12:22:25 PM
Project: C:\Users\user\OneDrive - Urban Engineering (Pty) Ltd\Projects\2019-07-09 Stilbaai Aftree Oord\3_Working\SIDRA\Stilbaai.sip8

MOVEMENT SUMMARY

Site: 101v [2024 AM - 2 way stop]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	36	0.0	0.124	5.7	LOS A	0.1	0.7	0.04	0.11	0.04	57.2
5	T1	191	0.0	0.124	0.0	LOS A	0.1	0.7	0.04	0.11	0.04	58.8
6	R2	9	0.0	0.124	6.2	LOS A	0.1	0.7	0.04	0.11	0.04	56.6
Approach		236	0.0	0.124	1.1	NA	0.1	0.7	0.04	0.11	0.04	58.5
NorthEast: Gravel Access Road												
7	L2	2	0.0	0.099	8.9	LOS A	0.3	2.3	0.52	0.97	0.52	49.7
8	T1	1	0.0	0.099	10.8	LOS B	0.3	2.3	0.52	0.97	0.52	49.5
9	R2	50	0.0	0.099	11.9	LOS B	0.3	2.3	0.52	0.97	0.52	49.3
Approach		53	0.0	0.099	11.8	LOS B	0.3	2.3	0.52	0.97	0.52	49.3
NorthWest: MR332 (Main Road)												
10	L2	13	0.0	0.154	6.3	LOS A	0.4	3.1	0.17	0.14	0.17	56.5
11	T1	212	0.0	0.154	0.3	LOS A	0.4	3.1	0.17	0.14	0.17	58.1
12	R2	54	0.0	0.154	6.3	LOS A	0.4	3.1	0.17	0.14	0.17	55.9
Approach		279	0.0	0.154	1.7	NA	0.4	3.1	0.17	0.14	0.17	57.6
SouthWest: MR331 (Jongensfontein)												
1	L2	92	0.0	0.152	8.8	LOS A	0.6	4.1	0.35	0.90	0.35	51.1
2	T1	1	0.0	0.152	11.0	LOS B	0.6	4.1	0.35	0.90	0.35	50.8
3	R2	42	0.0	0.152	11.4	LOS B	0.6	4.1	0.35	0.90	0.35	50.6
Approach		135	0.0	0.152	9.7	LOS A	0.6	4.1	0.35	0.90	0.35	50.9
All Vehicles		703	0.0	0.154	3.8	NA	0.6	4.1	0.19	0.34	0.19	55.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [2024 NM - 2 way stop]

New Site
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	45	0.0	0.135	5.8	LOS A	0.1	0.9	0.06	0.13	0.06	57.0
5	T1	199	0.0	0.135	0.1	LOS A	0.1	0.9	0.06	0.13	0.06	58.6
6	R2	12	0.0	0.135	6.4	LOS A	0.1	0.9	0.06	0.13	0.06	56.4
Approach		256	0.0	0.135	1.4	NA	0.1	0.9	0.06	0.13	0.06	58.2
NorthEast: Gravel Access Road												
7	L2	2	0.0	0.107	9.0	LOS A	0.4	2.5	0.54	1.00	0.54	49.4
8	T1	7	0.0	0.107	11.6	LOS B	0.4	2.5	0.54	1.00	0.54	49.2
9	R2	45	0.0	0.107	12.6	LOS B	0.4	2.5	0.54	1.00	0.54	49.0
Approach		54	0.0	0.107	12.3	LOS B	0.4	2.5	0.54	1.00	0.54	49.0
NorthWest: MR332 (Main Road)												
10	L2	16	0.0	0.190	6.4	LOS A	0.7	4.6	0.22	0.17	0.22	56.1
11	T1	241	0.0	0.190	0.4	LOS A	0.7	4.6	0.22	0.17	0.22	57.6
12	R2	81	0.0	0.190	6.4	LOS A	0.7	4.6	0.22	0.17	0.22	55.6
Approach		338	0.0	0.190	2.1	NA	0.7	4.6	0.22	0.17	0.22	57.1
SouthWest: MR331 (Jongensfontein)												
1	L2	73	0.0	0.123	8.9	LOS A	0.5	3.2	0.36	0.90	0.36	50.9
2	T1	1	0.0	0.123	11.6	LOS B	0.5	3.2	0.36	0.90	0.36	50.7
3	R2	31	0.0	0.123	12.2	LOS B	0.5	3.2	0.36	0.90	0.36	50.4
Approach		105	0.0	0.123	9.9	LOS A	0.5	3.2	0.36	0.90	0.36	50.8
All Vehicles		753	0.0	0.190	3.7	NA	0.7	4.6	0.20	0.32	0.20	55.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [2024 PM - 2 way stop]

New Site
Site Category: (None)
Stop (Two-Way)

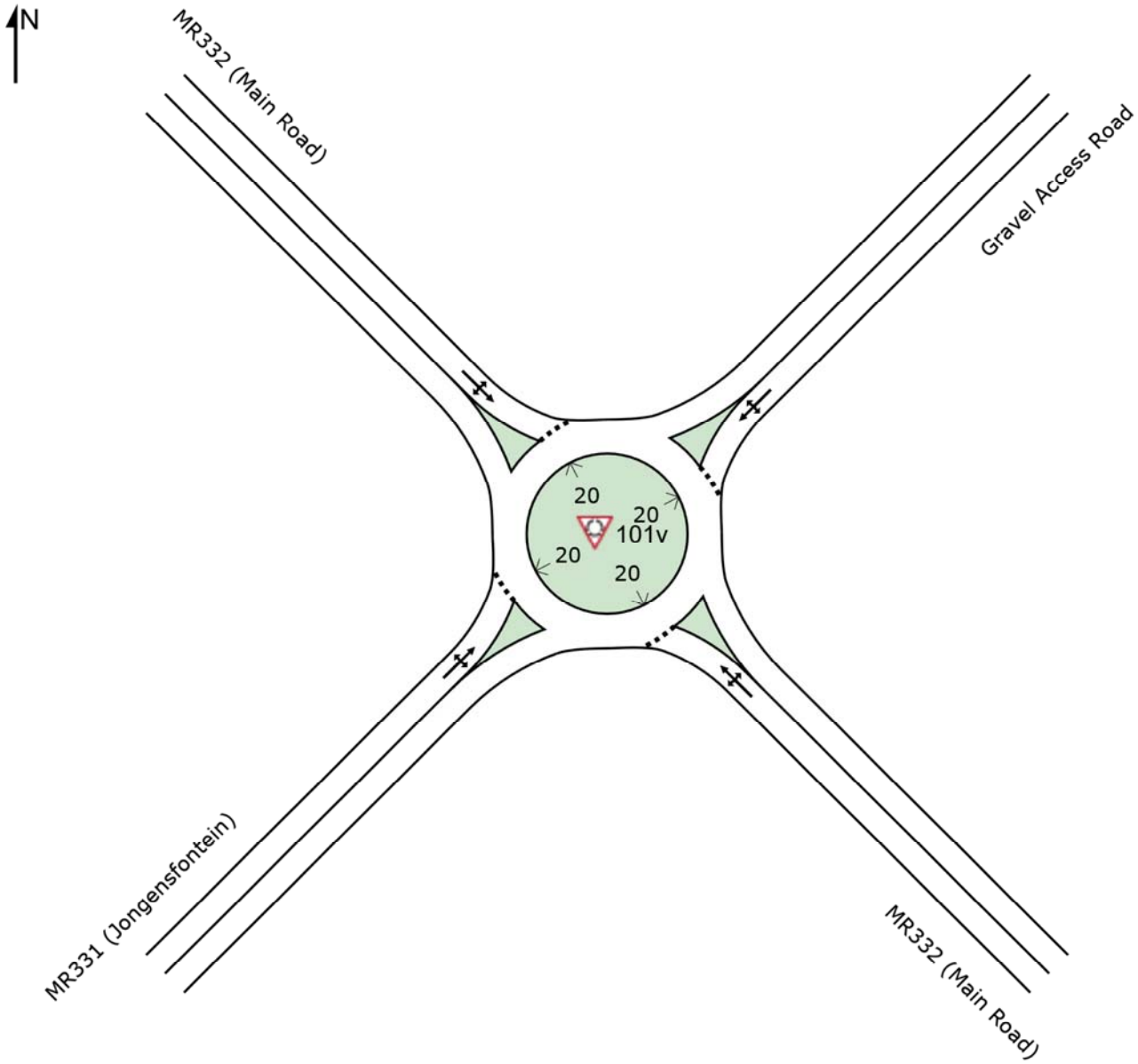
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	27	0.0	0.116	5.8	LOS A	0.1	0.8	0.05	0.10	0.05	57.3
5	T1	182	0.0	0.116	0.1	LOS A	0.1	0.8	0.05	0.10	0.05	58.8
6	R2	11	0.0	0.116	6.2	LOS A	0.1	0.8	0.05	0.10	0.05	56.7
Approach		220	0.0	0.116	1.1	NA	0.1	0.8	0.05	0.10	0.05	58.5
NorthEast: Gravel Access Road												
7	L2	12	0.0	0.077	8.9	LOS A	0.3	1.8	0.46	0.94	0.46	50.1
8	T1	7	0.0	0.077	11.0	LOS B	0.3	1.8	0.46	0.94	0.46	49.9
9	R2	28	0.0	0.077	12.2	LOS B	0.3	1.8	0.46	0.94	0.46	49.7
Approach		47	0.0	0.077	11.2	LOS B	0.3	1.8	0.46	0.94	0.46	49.8
NorthWest: MR332 (Main Road)												
10	L2	14	0.0	0.181	6.3	LOS A	0.7	4.8	0.22	0.20	0.22	55.9
11	T1	214	0.0	0.181	0.4	LOS A	0.7	4.8	0.22	0.20	0.22	57.4
12	R2	93	0.0	0.181	6.2	LOS A	0.7	4.8	0.22	0.20	0.22	55.3
Approach		321	0.0	0.181	2.3	NA	0.7	4.8	0.22	0.20	0.22	56.7
SouthWest: MR331 (Jongensfontein)												
1	L2	80	0.0	0.164	8.8	LOS A	0.6	4.4	0.37	0.91	0.37	50.8
2	T1	1	0.0	0.164	11.3	LOS B	0.6	4.4	0.37	0.91	0.37	50.5
3	R2	52	0.0	0.164	12.0	LOS B	0.6	4.4	0.37	0.91	0.37	50.3
Approach		133	0.0	0.164	10.1	LOS B	0.6	4.4	0.37	0.91	0.37	50.6
All Vehicles		721	0.0	0.181	3.9	NA	0.7	4.8	0.21	0.35	0.21	55.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101v [2024 AM - Conversion]

New Site
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101v [2024 AM - Conversion]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	36	0.0	0.181	4.5	LOS A	1.1	8.0	0.32	0.45	0.32	54.0
5	T1	191	0.0	0.181	4.7	LOS A	1.1	8.0	0.32	0.45	0.32	55.3
6	R2	9	0.0	0.181	9.4	LOS A	1.1	8.0	0.32	0.45	0.32	55.3
Approach		236	0.0	0.181	4.9	LOS A	1.1	8.0	0.32	0.45	0.32	55.1
NorthEast: Gravel Access Road												
7	L2	2	0.0	0.050	5.5	LOS A	0.3	2.0	0.48	0.64	0.48	50.8
8	T1	1	0.0	0.050	5.8	LOS A	0.3	2.0	0.48	0.64	0.48	51.9
9	R2	50	0.0	0.050	10.4	LOS B	0.3	2.0	0.48	0.64	0.48	51.9
Approach		53	0.0	0.050	10.2	LOS B	0.3	2.0	0.48	0.64	0.48	51.9
NorthWest: MR332 (Main Road)												
10	L2	13	0.0	0.194	4.1	LOS A	1.3	9.2	0.22	0.45	0.22	53.9
11	T1	212	0.0	0.194	4.4	LOS A	1.3	9.2	0.22	0.45	0.22	55.2
12	R2	54	0.0	0.194	9.0	LOS A	1.3	9.2	0.22	0.45	0.22	55.2
Approach		279	0.0	0.194	5.3	LOS A	1.3	9.2	0.22	0.45	0.22	55.2
SouthWest: MR331 (Jongensfontein)												
1	L2	92	0.0	0.123	5.3	LOS A	0.7	5.1	0.47	0.59	0.47	53.1
2	T1	1	0.0	0.123	5.6	LOS A	0.7	5.1	0.47	0.59	0.47	54.3
3	R2	42	0.0	0.123	10.2	LOS B	0.7	5.1	0.47	0.59	0.47	54.3
Approach		135	0.0	0.123	6.8	LOS A	0.7	5.1	0.47	0.59	0.47	53.5
All Vehicles		703	0.0	0.194	5.8	LOS A	1.3	9.2	0.32	0.49	0.32	54.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [2024 NM - Conversion]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	45	0.0	0.203	4.7	LOS A	1.3	9.0	0.36	0.47	0.36	53.8
5	T1	199	0.0	0.203	4.9	LOS A	1.3	9.0	0.36	0.47	0.36	55.1
6	R2	12	0.0	0.203	9.6	LOS A	1.3	9.0	0.36	0.47	0.36	55.1
Approach		256	0.0	0.203	5.1	LOS A	1.3	9.0	0.36	0.47	0.36	54.9
NorthEast: Gravel Access Road												
7	L2	2	0.0	0.053	5.8	LOS A	0.3	2.1	0.51	0.64	0.51	51.1
8	T1	7	0.0	0.053	6.1	LOS A	0.3	2.1	0.51	0.64	0.51	52.2
9	R2	45	0.0	0.053	10.7	LOS B	0.3	2.1	0.51	0.64	0.51	52.2
Approach		54	0.0	0.053	9.9	LOS A	0.3	2.1	0.51	0.64	0.51	52.2
NorthWest: MR332 (Main Road)												
10	L2	16	0.0	0.229	4.1	LOS A	1.6	11.1	0.21	0.46	0.21	53.9
11	T1	241	0.0	0.229	4.4	LOS A	1.6	11.1	0.21	0.46	0.21	55.1
12	R2	81	0.0	0.229	9.0	LOS A	1.6	11.1	0.21	0.46	0.21	55.1
Approach		338	0.0	0.229	5.4	LOS A	1.6	11.1	0.21	0.46	0.21	55.1
SouthWest: MR331 (Jongensfontein)												
1	L2	73	0.0	0.096	5.3	LOS A	0.6	3.9	0.47	0.58	0.47	53.1
2	T1	1	0.0	0.096	5.6	LOS A	0.6	3.9	0.47	0.58	0.47	54.4
3	R2	31	0.0	0.096	10.2	LOS B	0.6	3.9	0.47	0.58	0.47	54.4
Approach		105	0.0	0.096	6.8	LOS A	0.6	3.9	0.47	0.58	0.47	53.5
All Vehicles		753	0.0	0.229	5.8	LOS A	1.6	11.1	0.32	0.50	0.32	54.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [2024 PM - Conversion]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: MR332 (Main Road)												
4	L2	27	0.0	0.175	4.6	LOS A	1.1	7.5	0.34	0.46	0.34	53.9
5	T1	182	0.0	0.175	4.9	LOS A	1.1	7.5	0.34	0.46	0.34	55.1
6	R2	11	0.0	0.175	9.5	LOS A	1.1	7.5	0.34	0.46	0.34	55.1
Approach		220	0.0	0.175	5.1	LOS A	1.1	7.5	0.34	0.46	0.34	55.0
NorthEast: Gravel Access Road												
7	L2	12	0.0	0.047	5.8	LOS A	0.3	1.8	0.52	0.62	0.52	51.8
8	T1	7	0.0	0.047	6.1	LOS A	0.3	1.8	0.52	0.62	0.52	53.0
9	R2	28	0.0	0.047	10.7	LOS B	0.3	1.8	0.52	0.62	0.52	53.0
Approach		47	0.0	0.047	8.8	LOS A	0.3	1.8	0.52	0.62	0.52	52.7
NorthWest: MR332 (Main Road)												
10	L2	14	0.0	0.227	4.2	LOS A	1.6	11.0	0.26	0.48	0.26	53.5
11	T1	214	0.0	0.227	4.5	LOS A	1.6	11.0	0.26	0.48	0.26	54.8
12	R2	93	0.0	0.227	9.1	LOS A	1.6	11.0	0.26	0.48	0.26	54.7
Approach		321	0.0	0.227	5.8	LOS A	1.6	11.0	0.26	0.48	0.26	54.7
SouthWest: MR331 (Jongensfontein)												
1	L2	80	0.0	0.118	5.1	LOS A	0.7	4.9	0.44	0.59	0.44	52.9
2	T1	1	0.0	0.118	5.4	LOS A	0.7	4.9	0.44	0.59	0.44	54.1
3	R2	52	0.0	0.118	10.0	LOS B	0.7	4.9	0.44	0.59	0.44	54.1
Approach		133	0.0	0.118	7.0	LOS A	0.7	4.9	0.44	0.59	0.44	53.4
All Vehicles		721	0.0	0.227	6.0	LOS A	1.6	11.0	0.34	0.51	0.34	54.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.