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Final Traffic Study

For the proposed establishment of a Memorial Park on the Remainder of Farm Calcutta No. 29, Stellenbosch

Project No. : STUR0216

MARCH 2019

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TRANSPORT PLANNING AND TRAFFIC ENGINEERING

DOCUMENT CONTROL SHEET

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19 March 2019	Final	NAME Barend du Preez, Pr. Eng	NAME Sarah Larratt, Pr. Tech Eng
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TITLE: TRAFFIC IMPACT ASSESSMENT FOR THE PROPOSED CALCUTTA MEMORIAL PARK			
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SYNOPSIS: This report assesses the key transportation issues pertaining to the development of the proposed memorial park on the Remainder of Farm Calcutta No. 29, Stellenbosch.			

SUMMARY SHEET

Report Type	Final Traffic Study
Title	Calcutta Memorial Park
Location	Stellenbosch, Western Cape
Client	CK Rumboll & Partners
Reference Number	STUR0216
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Date	March 2019
Report Status	Final

This transport impact assessment has been prepared by a suitable qualified and registered professional traffic engineer. Details of any of the calculations on which the results of this report are based will be made available on request.

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ACRONYMS

TIA – Traffic Impact Assessment

SDP – Site Development Plan

LOS – Level of Service

PHF – Peak Hour Factor

NMT – Non-motorised Transport

RNIS – Road Network Information System

AM – Morning

PM – Afternoon

AMP – Arterial Management Plan

d – Average delay in seconds

v/c – Volume/capacity ratio

vph – vehicles per hour

Traffic Study	
For the proposed development of a memorial park on the Remainder of the Farm Calcutta No. 29, Stellenbosch	
1. Purpose of Report	<p>To determine the access location and expected transport related impacts of the proposed development on the surrounding road network.</p> <p>This TIA is submitted as part of the application for the proposed development of the Calcutta Memorial Park.</p>
2. Locality <i>Reference: Figure 1</i>	<p>Farm Calcutta No. 29, Stellenbosch, Western Cape.</p> <p>Description: The subject property is located approximately 10 km north of Stellenbosch, to the east of Main Road 174 (R304).</p>
3. Scope of Work	<p>The scope of work included in this TIA covers the following traffic engineering aspects:</p> <ul style="list-style-type: none"> • Site observations; • Existing and proposed development; • Access arrangements; • Existing and future road network planning; • Existing traffic flows in the vicinity of the development; • Trip generation of the proposed development; • Traffic flow analysis; • Recommended road upgrades if necessary; • Non-motorised transport (NMT); • Public transport; and • Parking requirements.
4. Existing and Proposed Development	<p>The subject property currently comprises approximately 39 ha of vacant land.</p> <p>The proposed memorial park will entail the facilities as indicated on the proposed Site Development Plan (SDP) below.</p> <p>The area that will be used for the actual cemetery uses includes:</p> <ul style="list-style-type: none"> • Memorial Park Centre - ±0.40 ha • Defined Zone - ± 0.69 ha • Columbarium Zone - ± 0.75 ha • Traditional Graves ± 9.42 ha • (Informal Zone) Lawn graves, Trees as headstones and future expansion of cemetery uses: ± 6.20 ha <p>Total size: ± 17.46 ha</p>



5. Land Use

Reference: Figure 2

Existing Use: Vacant

Proposed Use: Memorial Park (Cemetery)

Refer to Figure 2 for a copy of the latest SDP.

6. Existing and Proposed Access

Existing Access: There is currently no direct access to this portion of land from MR174.

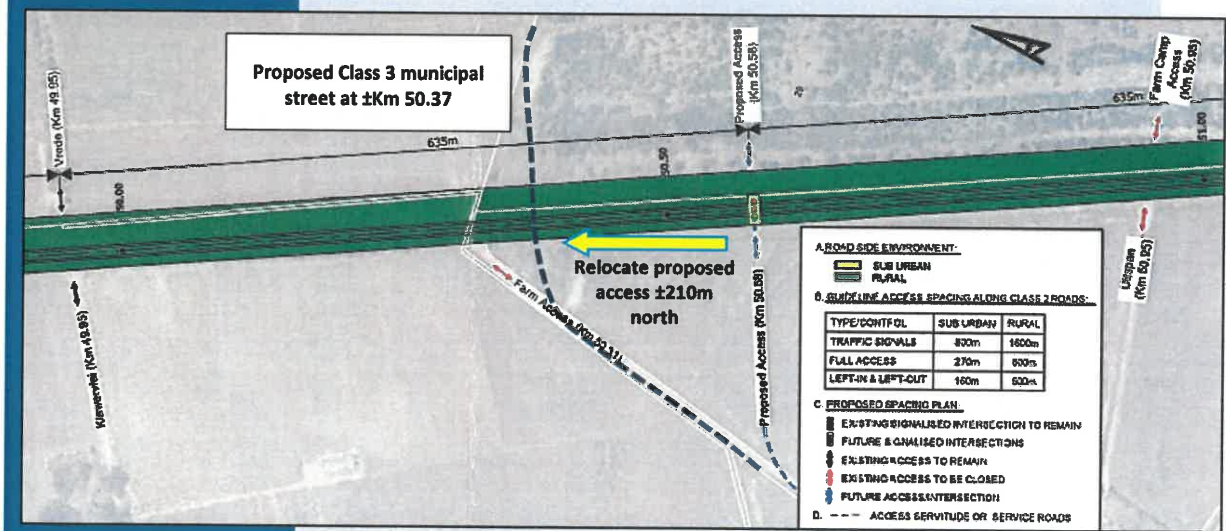
In 2012 ITS Engineers compiled an Arterial Management Plan for Main Road 174 (R304) (here after referred to as 2012 AMP) between Klipheuwel and Stellenbosch.

The copy of a portion of a table from the 2012 AMP below, provides the existing and proposed accesses between Old Paarl Road and Bottelary Road highlighting the proposed roundabout/signalised future intersections.

MR174 - KM 30.28 TO KM 60.28							
Location (Km)	Dist. (m)	Access/Intersection	Description	Existing Position	Proposed Position	Existing Control	Proposed Control and Access Recommendation
48.35	520	Future Intersection	Old Paarl Road & Proposed Access	West	East	Stop	Traffic Signal
48.49	140	Existing Access	Koelenhof Wine Cellars	East	None	Stop	Close / Relocate to km48.35
48.79	300	Existing Access	Gerrit & Lindie Scheneck	West	None	Stop	Close/Relocate to Km48.98
48.98	190	Future Intersection	Voorentoe & Proposed Access	East	West	Stop	Traffic Signal
49.29	310	Existing Access	Farm Access	West	None	Stop	Close/Relocate to Km48.98
49.46	170	Existing Access	County Fair	West	None	Stop	Close/Relocate to Km48.98
49.95	490	Existing Intersection	Vrede & Klawerviel	Both	N/A	Stop	Stop to remain
50.31	360	Existing Access	Farm Access	West	None	Stop	Close
50.58	270	Future Intersection	Proposed Intersection	N/A	Both	N/A	Traffic Signal
50.95	370	Existing Intersection	Uitspan & Farm Access	Both	N/A	Stop	Close
51.23	280	Future Intersection	San Michelle & Proposed Access	West	East	Stop	Stop to remain
51.27	40	Existing Access	Tramifloc Systems	East	None	Stop	Close/Relocate to Km51.23
51.42	150	Existing Access	House Access	West	None	Stop	Close/Relocate to Km51.23
51.85	430	Future Intersection	Farm Access & Proposed Access	West	West	Stop	Stop to remain
51.86	10	Existing Access	Farm Access	West	None	Stop	Close
52.16	300	Existing Access	Rouba	West	None	Stop	Close/Relocate to Km51.85
52.36	200	Future Intersection	Proposed Intersection	N/A	Both	N/A	Traffic Signal
52.69	330	Existing Access	House Access	East	None	Stop	Close/Relocate to Km52.36
52.73	40	Existing Access	Corobrick	West	None	Stop	Close
53.19	460	Existing Intersection	Kromme Rhee (DR 1085) & Bottelary Road	Both	N/A	Traffic Signal	Roundabout

Proposed Access: The 2012 AMP suggested a future roundabout or signalised intersection off MR174 at Km 50.58 providing full access to both sides consolidating the existing accesses at Km 50.31 and Km 50.95 on the western side.

In order for the proposed cemetery to not have direct access off MR174 and divide the site in two, it is proposed that the intersection is relocated $\pm 210m$ north (Km 50.37) allowing for a municipal street to be constructed along the northern boundary which would provide access to the cemetery.



The farm access to the west of MR 174 at Km 50.31 will have to be realigned at the same time as the proposed access is implemented at Km 50.37.

The realignment is also affected by the ESKOM servitude as indicated below.



It is proposed that the access road off MR174 should be a Class 3 municipal street which would also serve possible future developments to the east. The proposed access to the cemetery is approximately 460m from MR174. This would ensure that any queuing that may occur at the entrance to the cemetery would not impact the sideroad stop-controlled intersection on MR174.



It is not anticipated that the signalisation of the intersection on MR174 will be required before the dualling of Main Road 174 takes place.

The proposed location for the access will still ensure sufficient access spacing to the adjacent accesses / intersections.

7. Existing Roadways

Main Road 174 (MR174): Main Road 174 is a Class 2 Primary Arterial road with one lane per direction, a 100km/h speed limit, surfaced shoulders on both sides and no sidewalks. The road reserve can accommodate future dualling. It is a proclaimed Main Road (MR174) for which the WCG is the road authority. RNIS classifies this as a R3a road in terms of RCAM.



Stopping and Shoulder Sight Distances at the intersection will be more than adequate in both directions being on a stretch of the road that is very straight and flat.

8. Future Road Network

There are no planned roads in the vicinity of the site that will impact the proposed Calcutta Memorial Park. The future dualling of Main Road 174 will result in the possible upgrading of the proposed access to a roundabout or signalised intersection. However, the 2012 AMP looked at future traffic flows and came to the following conclusion: *“Old Paarl Road (MR 189) to Bottelary Road (MR 187) [km 47.83 to km 53.19]: This section will require additional through lanes, i.e. two lanes per direction within the next 10 to 15 years and will operate acceptably for the next 30 years under moderate growth scenarios. However, with higher growth, a third through lane per direction will be required in the next 25 to 30 years.”*

Based on the above the dualling of the section of MR174 between Old Paarl Road and Bottelary Road would be required between 2021 (2011 plus 10 years) and 2026 (2011 plus 15 years) depending on the rate of traffic growth. However, the existing intersections will require localised improvements to increase the stop line capacity which could include grade separation as discussed in detail in the 2012 AMP.

9. Analyses Hours

It was assumed that the worst case would be when a funeral takes place on a Friday midday when the traffic flow between Stellenbosch and the N1 is the highest for a midday. Saturday midday traffic flows are lower although more funerals take place over weekends for which analyses were also conducted.

10. Scenarios Analysed	<ul style="list-style-type: none"> • 2019 Present Traffic Demand plus Development (Figures 3 & 4) • 2024 Background Traffic Demand plus Development (Figures 5 & 6) <p>Intersection analyses were done using SIDRA Intersection software (version 8).</p>
11. Study Intersections	<p>The proposed intersection at ±Km 50.37 on MR174 via which the cemetery will gain access.</p>
12. Existing Operations	<p>The Road Network Information System (RNIS) operated by Western Cape Department of Transport and Public Works contains a Traffic Counting System (TCS) which serves the Western Cape Provincial Network and has been around since 1999. The main emphasis of the system is on Trunk -, Main - and Divisional Roads - currently only Minor Roads (OPs) that intersect with more important roads are on the system. The TCS comprises of two "types" of counts namely: - Short Term and Permanent Counts. TCS has data for a counting station (4252) at the Old Paarl/MR174 intersection as well as a permanent station (5011) between the Sandringham Road and Old Paarl Road intersections.</p>

Traffic Counts				
Time	Light	Heavy	Taxis	Buses
00-01h00				
01-02h00				
02-03h00				
03-04h00				
04-05h00	49	10	4	1
05-06h00	170	17	2	2
Sub-Totals	219	27	6	3
06-07h00	906	35	25	4
07-08h00	1264	31	9	3
08-09h00	975	36	4	1
09-10h00	964	68	6	0
10-11h00	986	71	7	0
11-12h00	935	66	6	0
12-13h00	1200	67	6	0
13-14h00	993	53	4	1
14-15h00	1104	50	5	1
15-16h00	1133	35	6	2
16-17h00	1376	80	7	0
17-18h00	1107	37	5	1
Sub-Totals	12943	649	90	13
18-19h00	876	22	3	0
19-20h00	549	12	3	2
20-21h00	336	6	1	0
21-22h00	257	10	8	0
22-23h00				
23-24h00				
Sub-Totals	2018	50	15	2
Totals	15180	726	111	18

Station AADT's				
Light	Heavy	Taxis	Buses	
12903	617	94	15	
Total	13629			

Station Data	
Station No	4252C
Road No	MR00174
Km Distance	48.35
Count Date	22/01/2016
Hours Counted	18
Day Counted	Friday
Counted by	C
Expansion Factor	0.85
Night Factor	
Stratum	8A
Peak Hour Ratio	9.50
Total AADT	13630

Sketch (Click on Leg to Display Data)

Print

Print

Intersection Diagram

Growth Rate

Growth Rate Chart

Historical Data

2016/01/22

Exit

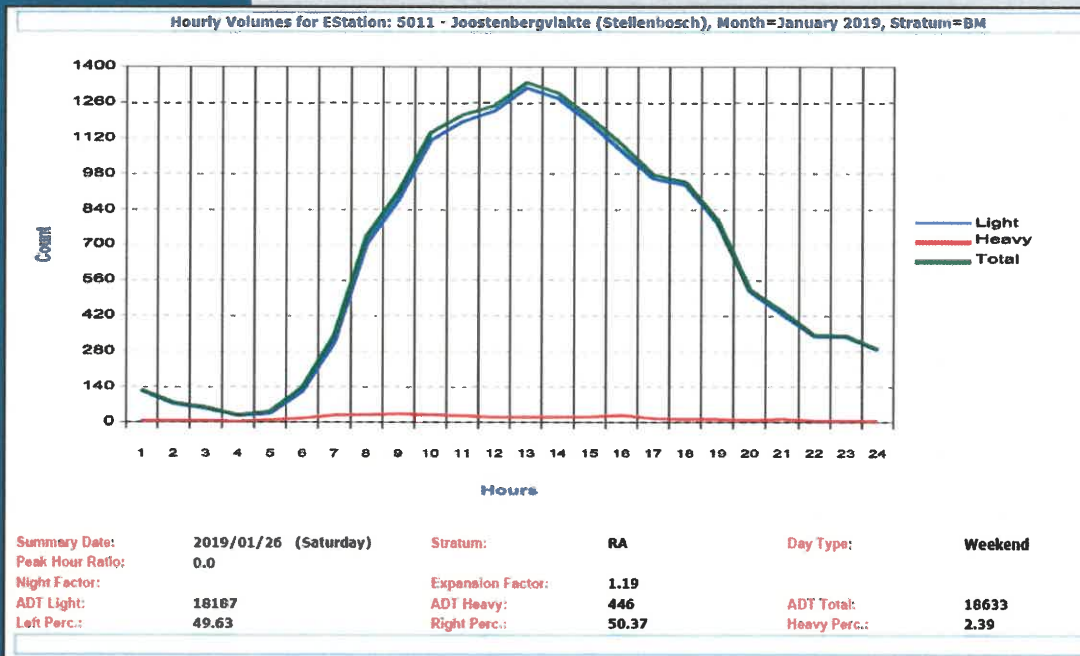
Station Data

Station Counts Chart

Light
 Heavy
 Taxis
 Buses
 Total

The last count at Station 4252 took place on Friday, 22 January 2016. The midday peak hour is clearly visible with approximately 1 270 vehicles per hour (2-way) on the southern leg of the intersection. The estimated direction split is 60% towards Stellenbosch and 40% away from Stellenbosch. There are very few accesses between the counting station and the proposed access road and therefore it is assumed that the traffic past the development will be very similar.

The Saturday count was retrieved from the permanent Station 5011 for Saturday 19 January 2019.



From the graph, a two-way traffic volume of 1330 can be used for the Saturday peak hour. A split of 60/40 towards Stellenbosch has been assumed.

13. Known Developments

There are no known developments for which applications have been submitted close to the Memorial Park that would have a significant impact on the intersection which would not be covered by the growth in background traffic.

14. Background Traffic

The 2012 AMP based most of its analyses on a traffic growth rate of 5% per annum which was used to estimate the 2019 existing as well as the 2024 background Friday midday peak hour traffic volumes.

15. Trip Generation Rates

The vehicle trips that will be generated by the proposed development were calculated using the trip generation rates as provided in the TMH17 South African Trip Data Manual (Volume 1, September 2012) published by the Committee of Transport Officials (COTO).

The estimated trip generation rates for a Cemetery are:

566 Cemetery								1 Ha	
Description	AM Peak	PM Peak	Friday PM	Midday	Evening	Saturday	Sunday	Factor A	Factor B
Trip Rate	0.20	0.20		4.00		8.00			
% Heavy									
In/Out	70:30	35:65		75:25		50:50			
PHF Dev		0.65		0.65		0.65			
PHF Street									
Veh Occupancy									
% Pass-by									
% Diverted									

The proposed new intersection on MR174 was analysed for a Friday Midday and a Saturday peak hour. No peak hour reduction rates were applied as the property is located in a rural environment.

Data obtained from Stellenbosch Municipality for the number of funerals that took place in 2018 at the existing Jamestown Cemetery are:

- Monday to Friday: 110
- Saturday and Sunday: 376

Unfortunately, these numbers are very difficult to interpret without having more detail on the trends throughout the year. However, during weekdays there is approximately 1 funeral every second day. Weekends are much busier with between 4 and 5 funerals being held on a Saturday and Sunday.

16. Development Trips

The areas that will be used for the actual cemetery uses are:

- Memorial Park Centre - ±0.40 ha
- Defined Zone - ±0.69 ha
- Columbarium Zone - ±0.75 ha
- Traditional Graves ±9.42 ha
- (Informal Zone) Lawn graves, Trees as headstones and future expansion of cemetery uses: ±6.20 ha
- Total size: ± 17.46 ha

The total Friday midday peak hour trips likely to be generated by the cemetery are **70 vph**. For a Saturday peak hour, it would be **140 vph**.

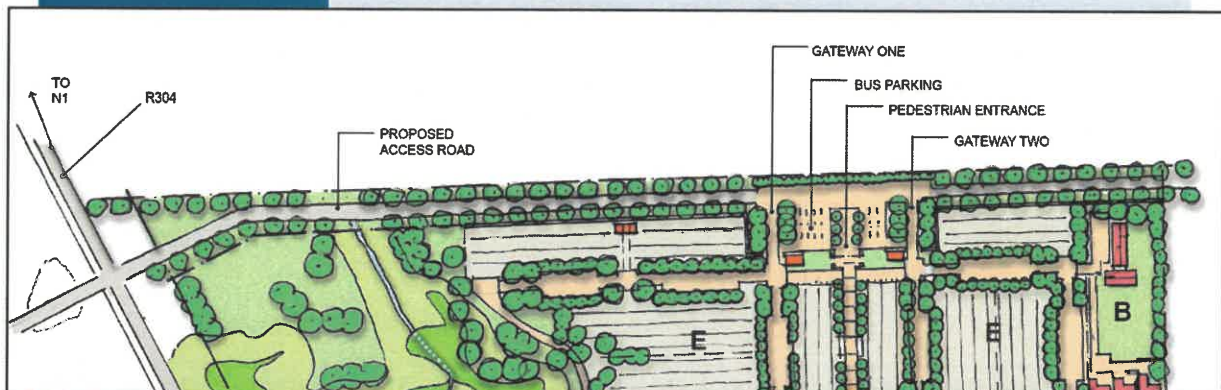
17. Trip Distribution

With the majority of the population in the Stellenbosch Municipal area staying in Stellenbosch town and surrounding it was estimated that 90% of the trips would come from Stellenbosch and 10% from the northern areas via Old Paarl Road and the N1.

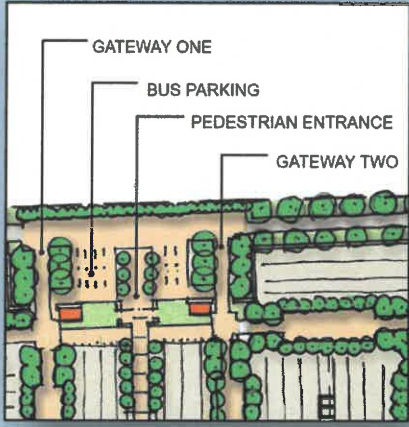
18. Total Traffic

The resulting development trips were added to the existing (2019) and expected (2024) background traffic volumes. The resulting total traffic volumes are shown in Figure 3, 4, 5 and 6.

<p>References: Figure 3, 4, 5 & 6</p>	
<p>19. Impact of Development Traffic</p> <p>References: Table 1 & 2</p>	<p>Overall, the proposed intersection will operate at acceptable levels of service and delay with the v/c showing that the intersection will be under capacity.</p> <p>The right turners from the side roads in the 2024 scenario show a high delay (LOS F) however the volumes and the v/c ratios are very low. If required, a left turn lane could be added on the proposed access approach going towards Stellenbosch.</p> <p>A right turn lane from Stellenbosch will be required to minimise the delay for through traffic on MR174 and to improve safety at the intersection. It is also proposed that a left turn taper be constructed for traffic coming from the north to the cemetery. The design of the intersection should meet the Provincial road design standards.</p>
<p>20. Site Access</p>	<p>Access to the site will be from the proposed municipal street as indicated on the SDP. Gateway One will be an IN-only entrance while Gateway Two will be an OUT-only exit. The detail design of the access will have to be agreed with Stellenbosch Municipality.</p>



<p>21. Parking Requirements</p>	<p>The layout allows for people to travel through the cemetery and park in allocated areas nearest to where they would need to be. Formal parking for buses is provided for at the entrance to the cemetery.</p>
<p>22. Non-Motorised Transport (NMT)</p>	<p>There are no NMT facilities along MR174 in the vicinity of the site. Pedestrian movements are very low, and pedestrians tend to use the gravel verges or the hard shoulders alongside the road if necessary. MR174 is a popular sport cycling route where cyclist use the shoulders as a cycle lane. Yellow line driving is very prominent along the road and it is recommended that a Class 2 NMT facility be constructed as part of the future dualling of the road which should allow for both pedestrians and cyclists.</p>

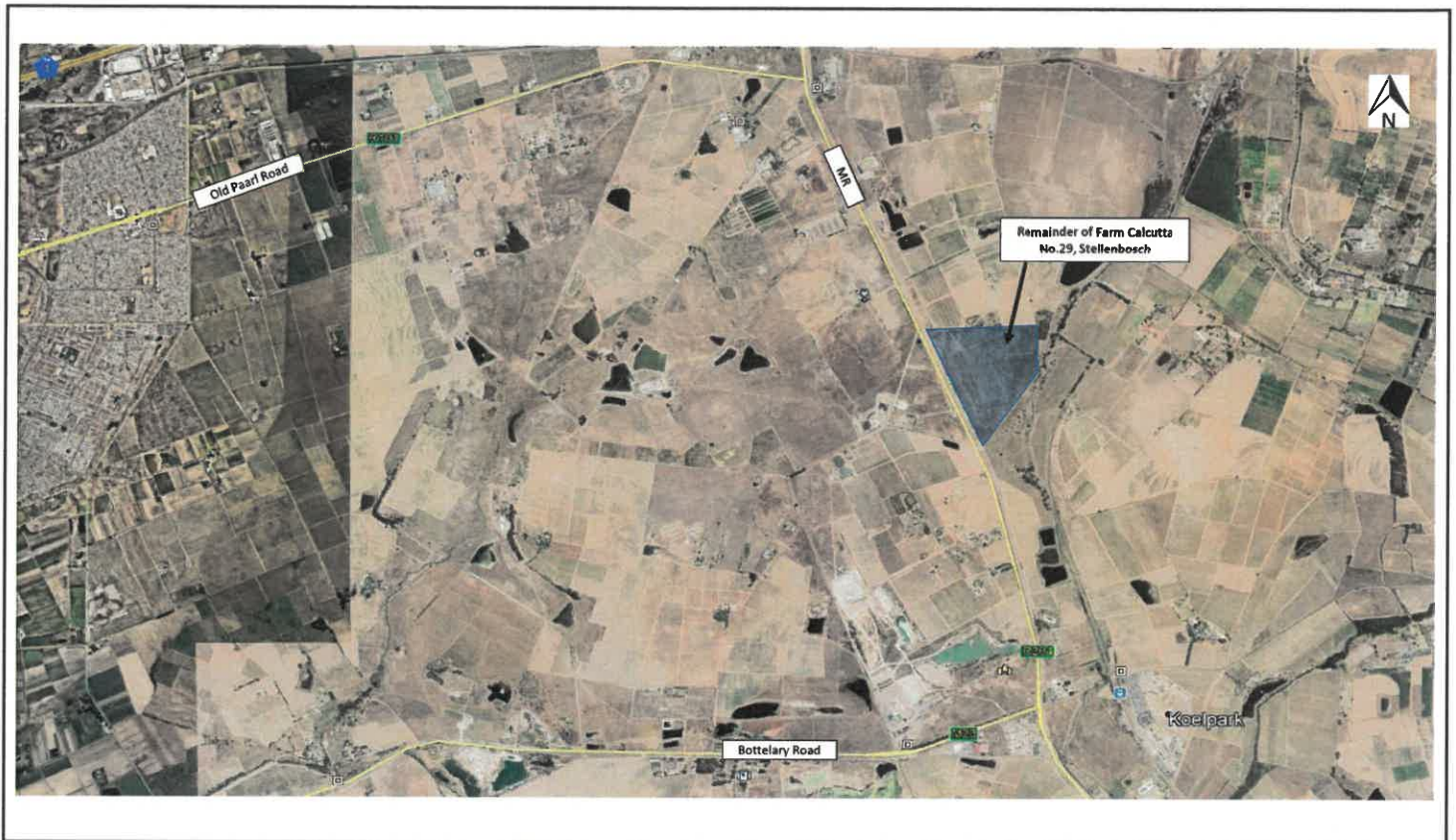
<p>23. Public Transport</p>	<p>Although minibus taxis and buses travel along MR174, no public transport facilities are provided on the section past the proposed site. Minibus taxis and buses will bring people to the cemetery and the layout does make provision for buses to park.</p>  <p>The diagram is a site plan showing a road layout. It features two gateways, 'GATEWAY ONE' and 'GATEWAY TWO', separated by a central area containing 'BUS PARKING' and a 'PEDESTRIAN ENTRANCE'. The plan shows various roadways, green spaces with trees, and building footprints.</p>
<p>24. Conclusions</p>	<p>The main findings and conclusions are:</p> <ul style="list-style-type: none"> • To allow for the proposed cemetery to be developed without taking direct access off MR174 and dividing the site into two, it is proposed that a municipal street be constructed along the northern boundary of the site. To achieve this the 2012 AMP proposed future roundabout/signalised intersection needs to be relocated. • The impact of the relocation will have a limited impact on the access spacing and still comply with the Access Management Guidelines (AMG). • The access to the cemetery will be located approximately 460m east from the new intersection on MR147. • MR174 carries approximately 1 500 veh/h two-way on a Friday midday and 1 360 veh/h two-way in the Saturday peak hour for 2019. • The 2012 AMP predicted that dualling of MR174 will be required between 2021 and 2026 depending on the traffic growth. • The intersection operates overall at acceptable levels of service for both scenarios. • The intersection will require a right turn lane for traffic travelling north on MR174. A left turn taper is proposed on the northern leg. The realignment of the farm access to the west will have to coincide with the construction of the intersection.
<p>25. Recommendations</p>	<p>From the report, the following recommendations are made:</p> <ul style="list-style-type: none"> • The new intersection at Km 50.37 must be designed and approved in accordance with the Provincial Standards; • The new municipal street and access to the cemetery must be designed and approved by Stellenbosch Municipality. <p>This report has shown that the proposed development can be accommodated by the adjacent transport network, provided the</p>

recommendations presented in the report are implemented. From a traffic engineering perspective, the application for this development is supported.

REFERENCES

1. Provincial Administration: Western Cape, Department of Economic Affairs, Agriculture and Tourism: Transport Branch, Road Access Guidelines and Policies, Sept 2002.
2. Western Cape Government: Access Management Guidelines, Draft, July 2016.
3. Department of Transport, Guidelines for Traffic Impact Studies, Report No. PR93/645, Pretoria, 1995.
4. Department of Transport, South African Trip Generation Rates, Report No. RR92/228, Pretoria, 1995.
5. Committee of Transport Officials (COTO), South African Trip Data Manual, Volume 1 TMH 17, September 2012.
6. Committee of Transport Officials (COTO), South African Traffic Impact and Site Traffic Assessment Manual Standards and Requirements Manual, Volume 2 TMH 16, September 2012.
7. Committee of Transport Officials (COTO), South African Traffic Impact and Site Traffic Assessment Manual, Volume 1 TMH 16, September 2012.

APPENDIX A: FIGURES



Transport Planning & Traffic Engineering
021 553 4167 / 083 701 2299

Project:

CALCUTTA MEMORIAL PARK

Job No:

STUR0216

LOCALITY PLAN

Figure:

1



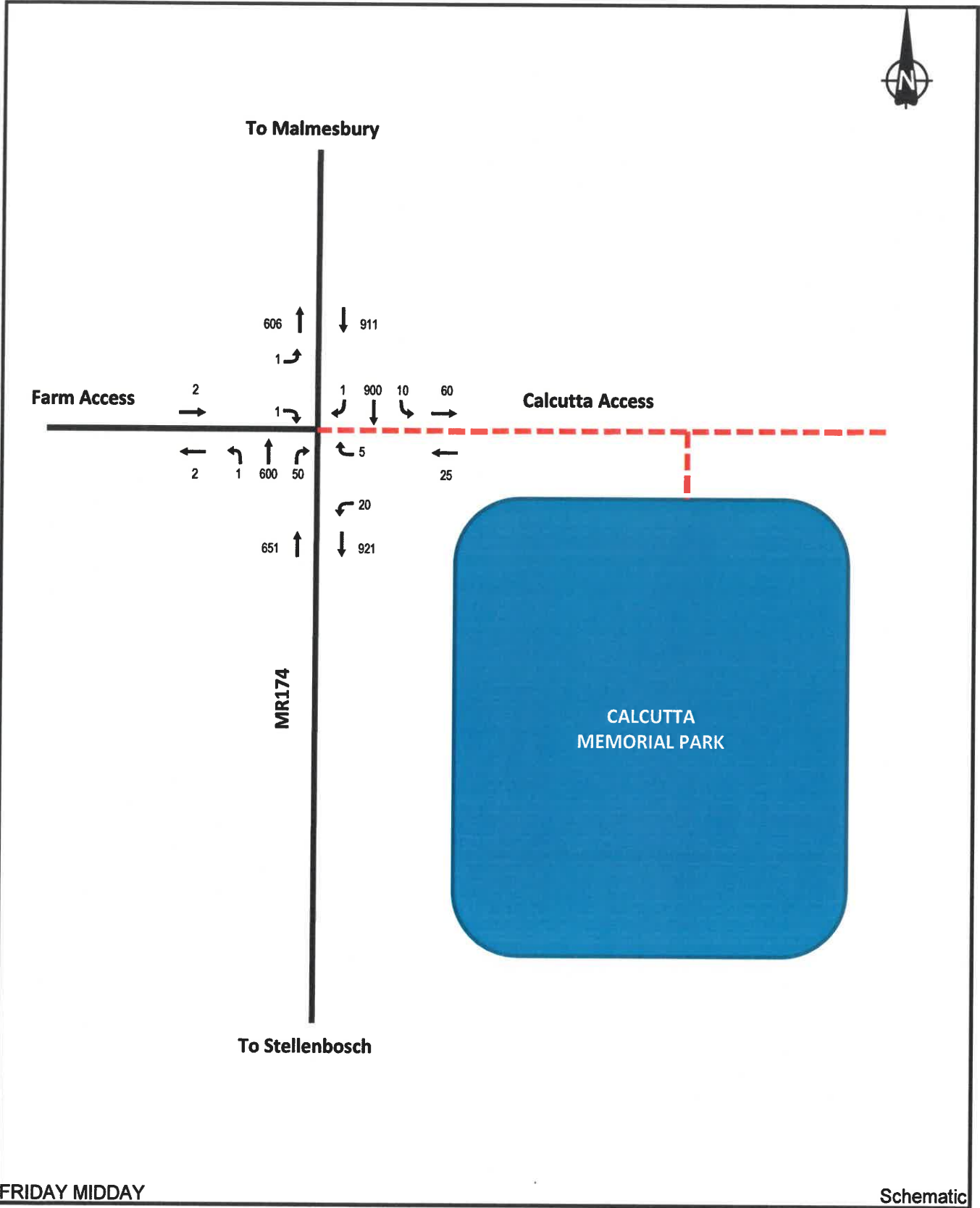
- LEGEND**
- A. Memorial Park Centre**
 - Chapel
 - Offices & Storage
 - Gates
 - Gathering space
 - B. Service Zone**
 - Workshop & Storage
 - Office
 - Holding Nursery
 - Staff Accommodation
 - C. Burial Zone**
 - Family & Groups
 - Family Crematorium
 - D. Columbarium Zone**
 - Niches & Urnshole Walls
 - Floor Panels
 - E. Transitional Graves**
 - Headstones
 - F. Informal Zones**
 - Lawn Graves
 - Trees in headstones
 - Future Expansion
 - Burials
 - Eco-Panels Station / Education
 - Heritage Interpretation
 - G. Wetland Buffer Zone**
 - Degraded & Military
 - Rehabilitation

CALCUTTA MEMORIAL PARK
 DATE: 4/2016-02/2016

STURGEON CONSULTING
 Transport Planning & Traffic Engineering
 021 553 4167 / 083 701 2299


Project:	CALCUTTA MEMORIAL PARK
	SITE DEVELOPMENT PLAN (N.T.S)

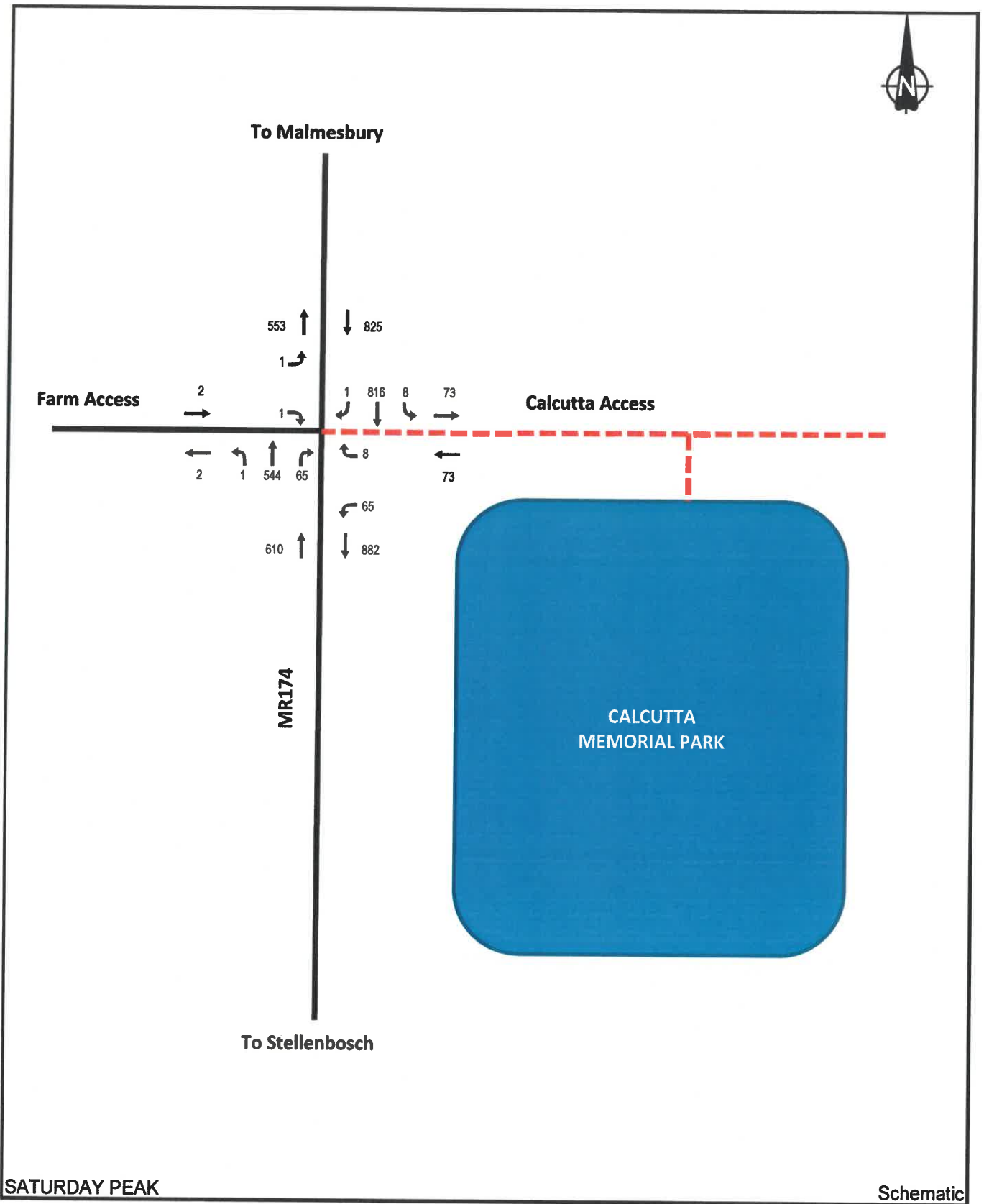
Job No:	STUR02016
Figure:	2



FRIDAY MIDDAY

Schematic

	Calcutta Memorial Park, Stellenbosch	Job Ref No: STUR0216
	Present Traffic Demand (2019) plus Development	Fig: 3

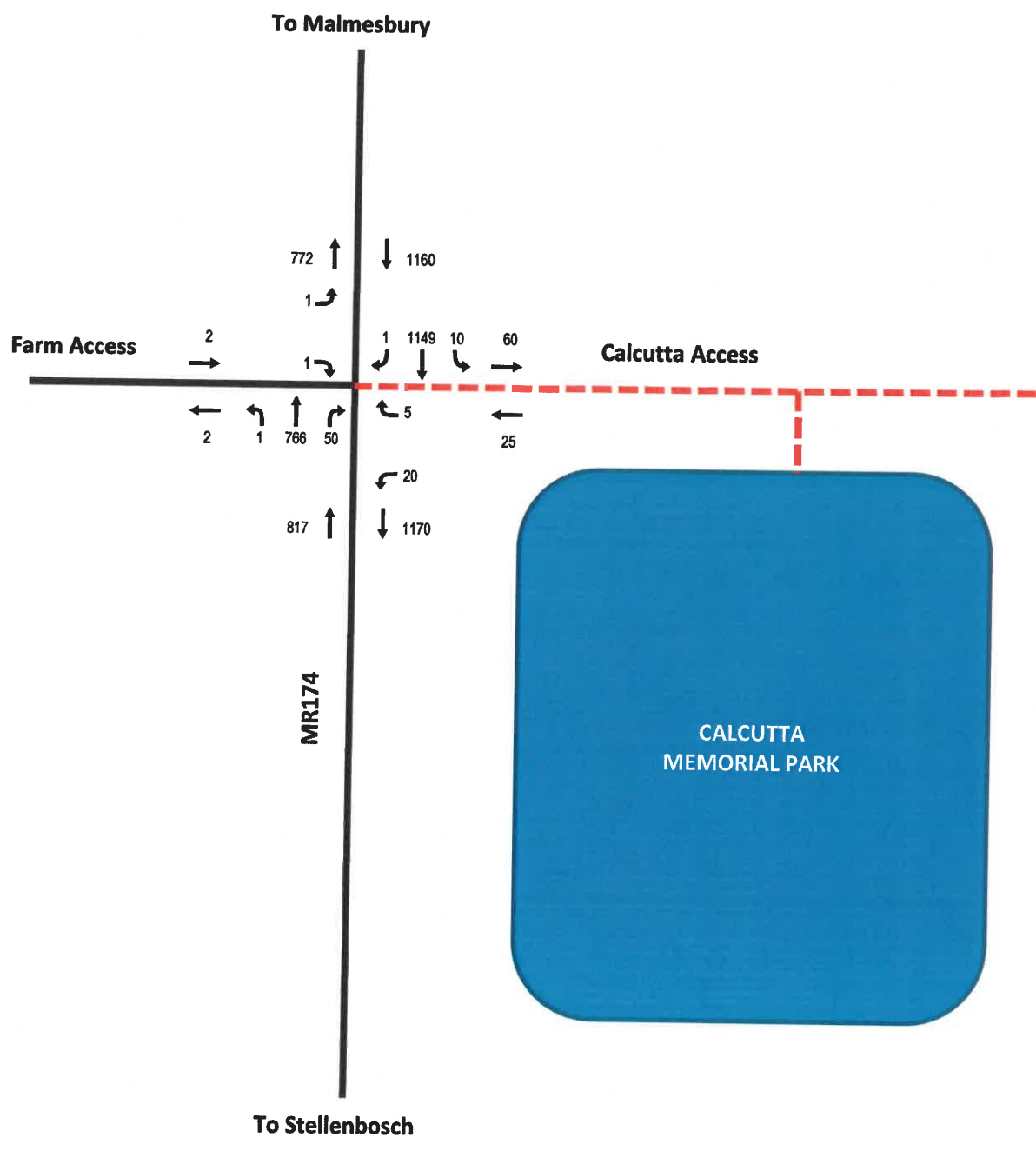


SATURDAY PEAK

Schematic




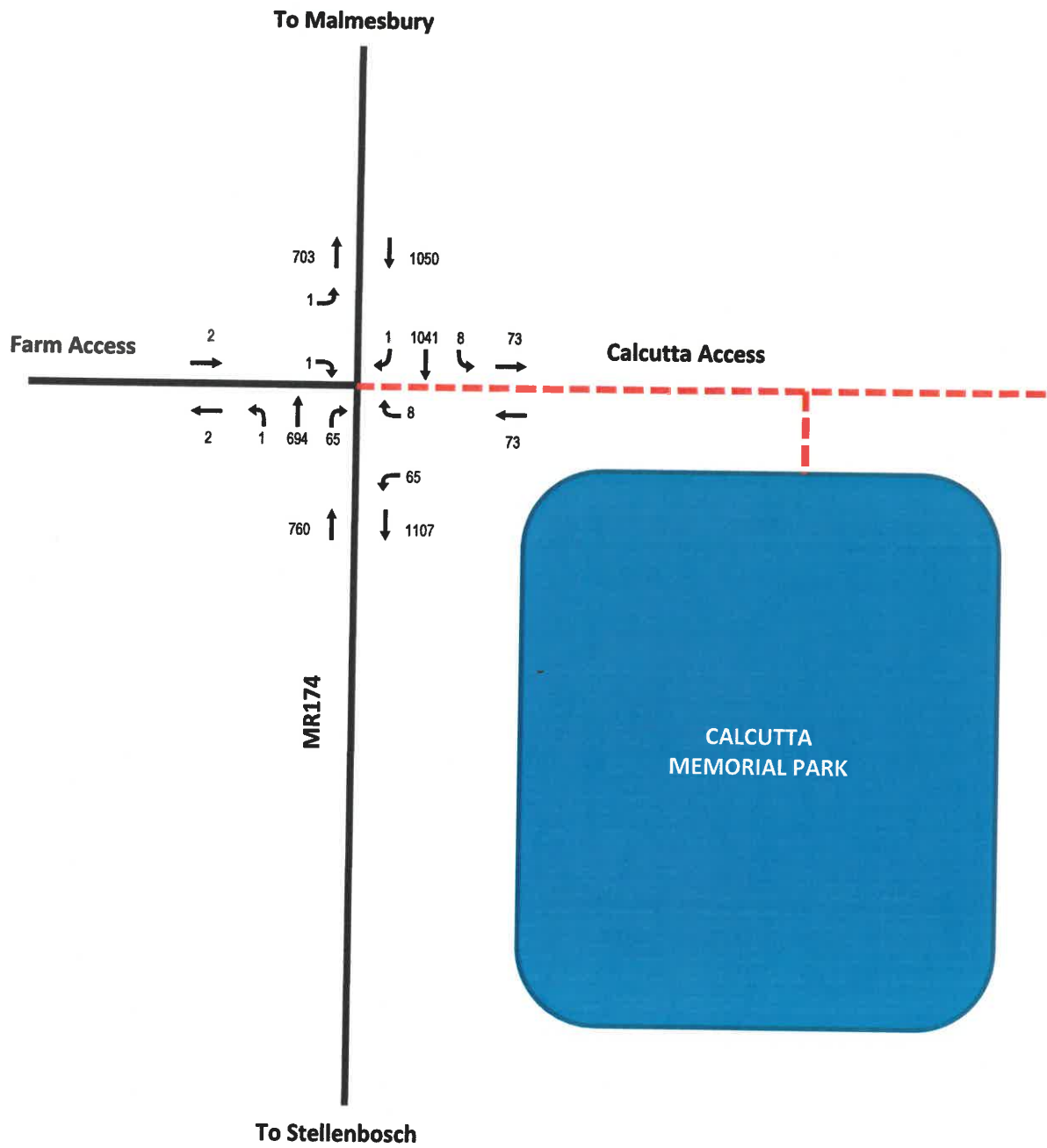
Calcutta Memorial Park, Stellenbosch	Job Ref No: STUR0216
Present Traffic Demand (2019) plus Development	Fig: 4



FRIDAY MIDDAY


Schematic

	Calcutta Memorial Park, Stellenbosch	Job Ref No: STUR0216
	Expected 2024 Traffic Demand plus Development	Fig: 5



SATURDAY PEAK

Schematic

	Calcutta Memorial Park, Stellenbosch	Job Ref No: STUR0216
	Expected 2024 Traffic Demand plus Development	Fig: 6

APPENDIX B: TABLES

Table 1: 2019 Peak Hour Traffic Conditions at Intersections

 **Site: 101 [MR174/Farm Access/Calcutta Access 2019 Fri MIDDAY]**

Friday MIDDAY
Site Category: Existing
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: MR174 S												
1	L2	1	2.0	0.436	17.0	LOS C	0.9	6.7	0.30	0.06	0.44	55.0
2	T1	632	2.0	0.436	2.6	LOS A	0.9	6.7	0.30	0.06	0.44	56.5
3	R2	53	2.0	0.436	16.9	LOS C	0.9	6.7	0.30	0.06	0.44	54.4
Approach		685	2.0	0.436	3.7	NA	0.9	6.7	0.30	0.06	0.44	56.3
East: Calcutta Access E												
4	L2	21	0.0	0.080	16.0	LOS C	0.1	0.9	0.83	1.00	0.83	45.5
5	T1	1	0.0	0.080	24.4	LOS C	0.1	0.9	0.83	1.00	0.83	45.3
6	R2	5	0.0	0.080	23.9	LOS C	0.1	0.9	0.83	1.00	0.83	45.1
Approach		27	0.0	0.080	19.4	LOS C	0.1	0.9	0.83	1.00	0.83	45.4
North: MR174 N												
7	L2	11	2.0	0.499	6.3	LOS A	0.0	0.1	0.00	0.01	0.01	56.2
8	T1	947	2.0	0.499	0.0	LOS A	0.0	0.1	0.00	0.01	0.01	59.9
9	R2	1	2.0	0.499	11.6	LOS B	0.0	0.1	0.00	0.01	0.01	57.5
Approach		959	2.0	0.499	0.1	NA	0.0	0.1	0.00	0.01	0.01	59.9
West: Farm Access W												
10	L2	1	0.0	0.011	11.9	LOS B	0.0	0.1	0.81	0.92	0.81	45.4
11	T1	1	0.0	0.011	23.8	LOS C	0.0	0.1	0.81	0.92	0.81	45.2
12	R2	1	0.0	0.011	23.1	LOS C	0.0	0.1	0.81	0.92	0.81	45.0
Approach		3	0.0	0.011	19.6	LOS C	0.0	0.1	0.81	0.92	0.81	45.2
All Vehicles		1675	2.0	0.499	1.9	NA	0.9	6.7	0.14	0.05	0.20	56.1

 Site: 101 [MR174/Farm Access/Calcutta Access 2019 Sat Midday]

Saturday Midday
Site Category: Existing
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: MR174 S												
1	L2	1	2.0	0.414	14.3	LOS B	0.0	6.5	0.34	0.08	0.48	55.0
2	T1	573	2.0	0.414	2.5	LOS A	0.0	6.5	0.34	0.08	0.48	56.5
3	R2	66	2.0	0.414	14.3	LOS B	0.0	6.5	0.34	0.08	0.48	54.4
Approach		642	2.0	0.414	3.7	NA	0.0	6.5	0.34	0.08	0.48	56.3
East: Calcutta Access E												
4	L2	68	0.0	0.163	16.2	LOS C	0.3	2.0	0.79	1.00	0.79	47.0
5	T1	1	0.0	0.163	20.9	LOS C	0.3	2.0	0.79	1.00	0.79	46.8
6	R2	8	0.0	0.163	20.6	LOS C	0.3	2.0	0.79	1.00	0.79	46.6
Approach		78	0.0	0.163	16.7	LOS C	0.3	2.0	0.79	1.00	0.79	47.0
North: MR174 N												
7	L2	6	2.0	0.452	6.3	LOS A	0.0	0.1	0.00	0.01	0.01	59.2
8	T1	859	2.0	0.452	0.0	LOS A	0.0	0.1	0.00	0.01	0.01	59.2
9	R2	1	2.0	0.452	10.3	LOS B	0.0	0.1	0.00	0.01	0.01	57.5
Approach		868	2.0	0.452	0.1	NA	0.0	0.1	0.00	0.01	0.01	59.9
West: Farm Access W												
10	L2	1	0.0	0.009	11.3	LOS B	0.0	0.1	0.76	0.89	0.76	46.8
11	T1	1	0.0	0.009	19.7	LOS C	0.0	0.1	0.76	0.89	0.76	46.8
12	R2	1	0.0	0.009	20.2	LOS C	0.0	0.1	0.76	0.89	0.76	46.4
Approach		3	0.0	0.009	17.1	LOS C	0.0	0.1	0.76	0.89	0.76	46.6
All Vehicles		1592	1.9	0.452	2.4	NA	0.0	6.5	0.16	0.09	0.24	57.6

Table 2: 2024 Peak Hour Traffic Conditions at Intersections

 **Site: 101 [MR174/Farm Access/Calcutta Access 2024 Fri MIDDAY]**

Friday MIDDAY
Site Category: 2024
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Vehicles	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: MR174 S												
1	L2	1	2.0	0.402	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	56.2
2	T1	766	2.0	0.402	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	50	2.0	0.132	14.9	LOS B	0.2	1.3	0.82	0.93	0.82	46.9
Approach		817	2.0	0.402	1.0	NA	0.2	1.3	0.05	0.06	0.05	56.9
East: Calcutta Access E												
4	L2	20	0.0	0.078	22.6	LOS C	0.1	0.9	0.89	1.00	0.89	43.1
5	T1	1	0.0	0.078	52.4	LOS F	0.1	0.9	0.89	1.00	0.89	43.0
6	R2	5	0.0	0.070	55.0	LOS F	0.1	0.5	0.96	1.00	0.96	31.3
Approach		26	0.0	0.078	30.0	LOS D	0.1	0.9	0.90	1.00	0.90	40.2
North: MR174 N												
7	L2	10	2.0	0.604	6.9	LOS A	0.0	0.2	0.01	0.01	0.01	56.2
8	T1	1148	2.0	0.604	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	59.9
9	R2	1	2.0	0.604	15.3	LOS C	0.0	0.2	0.01	0.01	0.01	57.5
Approach		1160	2.0	0.604	0.1	NA	0.0	0.2	0.01	0.01	0.01	56.9
West: Farm Access W												
10	L2	1	0.0	0.027	13.0	LOS B	0.0	0.2	0.92	0.94	0.92	36.2
11	T1	1	0.0	0.027	51.2	LOS F	0.0	0.2	0.92	0.94	0.92	36.2
12	R2	1	0.0	0.027	56.1	LOS F	0.0	0.2	0.92	0.94	0.92	36.1
Approach		3	0.0	0.027	40.1	LOS E	0.0	0.2	0.92	0.94	0.92	36.2
All Vehicles		2006	2.0	0.604	0.9	NA	0.2	1.3	0.04	0.04	0.04	59.0

 **Site: 101 [MR174/Farm Access/Calcutta Access 2024 Sat Midday]**

Saturday Midday
Site Category: 2024
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: MR174 S												
1	L2	1	2.0	0.363	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.2
2	T1	694	2.0	0.363	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	65	2.0	0.161	14.3	LOS B	0.2	1.6	0.80	0.92	0.80	47.2
Approach		760	2.0	0.363	1.3	NA	0.2	1.6	0.07	0.08	0.07	58.6
East: Calcutta Access E												
4	L2	65	0.0	0.208	22.3	LOS C	0.4	2.5	0.87	1.01	0.91	43.7
5	T1	1	0.0	0.208	59.6	LOS F	0.4	2.5	0.87	1.01	0.91	43.6
6	R2	8	0.0	0.121	60.1	LOS F	0.1	1.0	0.96	1.00	0.96	30.0
Approach		74	0.0	0.208	26.9	LOS D	0.4	2.5	0.88	1.01	0.91	41.6
North: MR174 N												
7	L2	8	2.0	0.546	6.9	LOS A	0.0	0.2	0.01	0.01	0.01	58.2
8	T1	1041	2.0	0.546	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	59.9
9	R2	1	2.0	0.546	13.5	LOS B	0.0	0.2	0.01	0.01	0.01	57.6
Approach		1050	2.0	0.546	0.1	NA	0.0	0.2	0.01	0.01	0.01	59.9
West: Farm Access W												
10	L2	1	0.0	0.032	12.7	LOS B	0.0	0.3	0.92	0.93	0.92	34.5
11	T1	1	0.0	0.032	55.3	LOS F	0.0	0.3	0.92	0.93	0.92	34.4
12	R2	1	0.0	0.032	67.8	LOS F	0.0	0.3	0.92	0.93	0.92	34.4
Approach		3	0.0	0.032	45.2	LOS E	0.0	0.3	0.92	0.93	0.92	34.4
All Vehicles		1857	1.9	0.546	1.7	NA	0.4	2.5	0.07	0.08	0.07	58.3