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TRAFFIC IMPACT ASSESSMENT

Garankuwa Erf 1427 & Erf 1719

City of Tshwane Metropolitan Municipality 225 Madiba Street Capital Towers North Pretoria 0001





TRAFFIC IMPACT ASSESSMENT

GARANKUWA ERF 1427 & ERF 1719

Gary Edwards Traffic Engineering (Pty) Ltd. 262 Bontrokkie Street Leeuwfontein Estates Kameelfontein 0035 **City of Tshwane Metropolitan Municipality** Capital Towers North 225 Madiba Street Pretoria 0001

October 2022

4 October 2022

City of Tshwane Metropolitan Municipality Roads & Stormwater Department

Room C312 Capitol Towers North 225 Madiba Street Pretoria 0001

Attention: Hellen Msiza

TRAFFIC IMPACT ASSESSMENT GARANKUWA ERF 1427 & ERF 1719

It is herewith certified that this Traffic Impact Assessment has been prepared according to the requirements of the South African Traffic Impact and Site Traffic Assessment Manual.

Please do not hesitate to contact me should you wish to discuss any aspect of the report or need any additional information.

Regards, **Gary Edwards (PrEng)** ECSA Reg No 20050184 B Hons (Transportation)

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TRAFFIC IMPACT ASSESSMENT GARANKUWA ERF 1427 & ERF 1719

EXECUTIVE SUMMARY

APPLICATION	Proposed Subdivision of Garankuwa Erf 1427 & Erf 1719				
PROPERTY SIZE	11.17 ha				
PROPOSED DEVELOPMENT	Erf 1427:368 residential 1 standsErf 1719:384 residential 1 standsTotal:752 residential 1 stands				
TRIP GENERATION	 Weekday AM: 384 trips (96 trips inbound and 288 trips outbound) Weekday PM: 384 trips (269 trips inbound and 115 trips outbound) 				
ACCESS	Access is proposed via the extension of the existing municipal road network				
ROAD IMPROVEMENTS	 Installation of a traffic signal along Lucas Mangope Drive at the access to Garankuwa (Road D) Construction of the collector road along the eastern boundary of Erf 1419 (Road C) Construction of the collector road between Erf 1427 and Erf 1419 (Road A) 				
PUBLIC TRANSPORT AND NMT FACILITIES	 Construction of 4 minibus-taxi lay-bys at the accesses to the site. Construction of a 2m wide paved pedestrian walkway along the street frontage of Erf 1427 and Erf 1719. 				
CONCLUSION	The proposed subdivision of Garankuwa Erf 1427 & Erf 1719 into 368 and 384 residential 1 stands be supported from a traffic engineering point of view.				



TRAFFIC IMPACT ASSESSMENT GARANKUWA ERF 1427 & ERF 1719

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TRAFFIC IMPACT ASSESSMENT GARANKUWA ERF 1427 & ERF 1719

1 INTRODUCTION

1.1 DEVELOPMENT PARTICULARS

A subdivision application was submitted by Durapi Consulting on behalf of the City of Tshwane Human Settlements Department for Erf 1427 and Erf 1719, Garankuwa to allow the following:

- Erf 1427: 368 Residential 1 stands
- Erf 1719: 384 Residential 1 stands

The combined site is approximately 11.17ha in extent and is located in the south-western area of Garankuwa – see Figure 1 (next page).

The preliminary township layout is shown in Appendix A.

Gary Edwards Traffic Engineering (Pty) Ltd. was appointed to conduct the traffic impact assessment of the planned township. This report addresses the following aspects:

- Existing surrounding road network and road master planning;
- Expected development trip generation, distribution and assignment;
- Operational conditions on the road network;
- Required road improvements; and
- Ancillary transport issues.

1.2 STUDY AREA

The following 6 intersections were included in the investigation. Owing to a lack of street names, reference is made to Road A, Road B, Road C and Road D – *see Figure 1*:

•	Intersection 1 – Road A / Road B	 – 2 Way Stop;
•	Intersection 2 – Road B / Road C	 – 1 Way Stop;
•	Intersection 3 – Road B / Road D	 Roundabout;
•	Intersection 4 – Road D / M21 / Lucas Mangope Drive	 4 Way Stop;
•	Intersection 5 – Rahube Street / Road B	 – 4 Way Stop; and
•	Intersection 6 – Rahube Street / Main Street	 – 1 Way Stop.



2 TRAFFIC VOLUMES

2.1 EXISTING TRAFFIC VOLUMES

A site visit was conducted on Friday 16 September 2022 to evaluate the layout of the surrounding road network and to observe the current peak operating conditions at the critical surrounding intersections. Weekday morning and afternoon peak period traffic counts were conducted on Tuesday 20 September between 06h15 and 08h30 in the morning and between 16h00 and 18h15 in the afternoon at the critical intersections to identify the existing peak hour traffic volumes on the surrounding road network. The recorded weekday AM (06H30 to 07h30) and PM (16h30 to 17h30) peak hour traffic volumes are shown in *Figure 2* (next page). During the traffic surveys, it was noted that no capacity constraints occurred on the roads near the site (Roads A to D) and low peak hour volumes prevailed.

2.2 LATENT DEVELOPMENTS

No known latent developments exist in the immediate surrounding area.

2.3 EXPECTED FUTURE VOLUMES

The expected future background traffic volumes were calculated by considering the recommended growth rates as contained in the TMH 17 document^(ref 1):

Table 2-1: Typical Growth Rates

Growth	Growth Rate
Low growth areas	0 – 3%
Average growth areas	3 – 4%
Above average growth areas	4 - 6%
Fast growing areas	6 – 8%
Exceptionally high growth areas	> 8%

A growth rate of 3% was considered appropriate for this study. The expected future (2027) background volumes are shown in *Figure 3*.



Figure 2 – Existing Weekday Peak Hour Traffic Volumes (2022)



Figure 3 – Expected Future (2027) Background Volumes

3 ANALYSES

3.1 ROAD PLANNING

The road planning of the City of Tshwane Metropolitan Municipality (CTMM) for the area surrounding the site is shown below:



Figure 4 – CTMM Road Planning

The following should be noted from the above planning:

- Road A is classified as a U4(b) collector road and will be extended to the south between Erf 1427 and Erf 1719.
- Road C is classified as a U4(b) collector road and will be extended to the south along the eastern boundary of Erf 1719.

3.2 TRIP GENERATION, DISTRIBUTION AND ASSIGNMENT

The expected peak hour trip generation of the planned township was calculated using the rates provided in the TMH17 document compiled by the Committee of Transport Officials^(ref 1). As recommended in the guideline document, reduction factors were applied to the trip generation rates to cater for the following:

- The planned erven are small (typically 210 m²) and will cater for the low income group. It is also clear from the traffic counts that low vehicle ownership prevails in the area.
- Residents are expected to depend heavily on public transport and a high percentage of minibustaxis travel on the surrounding road network.

The trip generation and reduction factors are summarised below.

Residential 1	
Land Use Code:	210 – Single Dwelling Units
Weekday AM Rate:	1.0 trip per unit (25% inbound and 75% outbound)
Reduction factors:	Low vehicle ownership 40%, Transit nodes 15%
Reduced AM Rate:	0.51 trips per unit
Weekday PM Rate:	1.0 trips per unit (70% inbound and 30% outbound)
Reduction factors:	Low vehicle ownership 40%, Transit nodes 15%
Reduced PM Rate:	0.51 trips per unit

The expected peak hour trip generation of the township is shown in the table below:

Frf	Extent	Trip Directional		nal Split	Expected Peak Hour Trip Generation				
L 11	Extent	Rate	Inbound	Outbound	Inbound	Outbound	Total		
			Weekday Al	M Peak Hour					
Erf 1427	368 units	0.51	25%	75%	47 trips	141 trips	188 trips		
Erf 1719	384 units	0.51	70%	30%	49 trips	147 trips	196 trips		
	96 trips	288 trips	384 trips						
	Weekday PM Peak Hour								
Erf 1427	368 units	0.51	70%	30%	132 trips	56 trips	188 trips		
Erf 1719	384 units	0.51	70%	30%	137 trips	59 trips	196 trips		
		Total			269 trips	115 trips	384 trips		

Table 3-1: Expected Peak Hour Trip Generation

The above shown trip estimation is considered to represent an absolute worst case scenario as the vehicle ownership of the residents is likely to be extremely low. In Ekurhuleni, the Local Council supports a trip generation rate of 0.30 trips per unit (instead of the 0.51 trips per unit applied in the above calculation) for similar "low income" residential developments.

The following trip distribution was used in the analyses and is based on the layout of the surrounding road network and the existing distribution of traffic along the surrounding road network.

Table 3-2: Assumed Trip Distribution

Road	From Direction	Percentage of trips	
Lucas Mangope Drive	North	10%	
Lucas Mangope Drive	South	40%	
Road D	East	5%	
Main Street	North	10%	
Main Street	Main Street South		
Road A	Road A North		
Road B	Northeast	5%	
Т	100 %		

The assignment of the additional development traffic on the road network during the critical weekday AM and PM peak hours are shown in *Figure 5* (next page). The expected 2022 and 2027 peak hour traffic volumes with the additional Garankuwa Erf 1427 and Erf 1719 traffic are shown in *Figure 6* and *Figure 7*.



Figure 5 – Expected Erf 1427 & Erf 1719 Development Traffic



Figure 6 – Expected 2022 Weekday Peak Hour Traffic With Erf 1427 & Erf 1719 Development Traffic



Figure 7 – Expected 2027 Weekday Peak Hour Traffic With Erf 1427 & Erf 1719 Development Traffic

4 CAPACITY ANALYSES

4.1 CAPACITY ANALYSES RESULTS

Capacity analyses were performed to evaluate the expected operating conditions on the surrounding road network. The PTV Vistro software^(ref 2) was used in the analyses. The output of the analyses is given as levels-of-service (LOS) which range from A (very good with minimum delay) to F (very bad with unacceptable delays). These levels-of-service (LOS) are based on the average delay experienced. The following scenarios were analysed:

- Scenario 1: 2022 Status Quo Weekday Peak Hour Volumes
- Scenario 2: Expected 2027 Weekday Peak Hour Background Volumes
- Scenario 3: Expected 2022 Weekday Peak Hour Traffic With Erf 1427 & Erf 1719 Traffic
- Scenario 4: Expected 2027 Weekday Peak Hour Traffic With Erf 1427 & Erf 1719 Traffic

The intersection levels of service are summarised below, and the detailed results are summarised and attached in *Appendix E*:

	Intersection Level of Service									
Intersection	Scen	ario 1	Scen	ario 2	Scen	ario 3	Scenario 4			
	AM	РМ	AM	РМ	AM	РМ	AM	РМ		
Intersection 1 Road A / Road B	А	А	А	А	А	А	А	А		
Intersection 2 Road B / Road C	А	А	А	А	А	А	А	А		
Intersection 3 Road B / Road D	A	A	А	А	A	A	А	А		
Intersection 4 Road D / Lucas Mangope Drive	F	F	F	F	F	F	F	F		
Intersection 5 Rahube Street / Road B	A	A	A	А	А	A	A	А		
Intersection 6 Rahube Street / Main Street	В	В	В	В	В	С	В	С		

Table 4-1: Expected Operational Conditions

4.2 INTERSECTION IMPROVEMENTS

Except for the intersection of Road D and Lucas Mangope Drive, the intersections provide sufficient capacity to cater for the existing and well as expected future background traffic volumes on the road network.

The high traffic volumes along Lucas Mangope Drive cause constraints at the intersection with road D. It is recommended that the control of this intersection be changed from a 4-way stop to a signalised intersection to allow the following improved operating conditions in the future with the growth in background volumes and the additional development traffic:

Table 4-2: Expected Improved Operating Conditions – Intersection of Road D / Lucas Mangope Drive Signalised

			So	outhern	Approa	ch	Eastern Approach			Northern Approach				Western Approach				
Peak Hour	Scenario	Intersection LOS	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right
			Luc	cas Man	gope D	rive		Roa	ad D		Lue	cas Man	igope D	rive		Roa	ad D	
AM	4	С	В	В	В	D	В	В	В	В	С	С	С	В	D	В	В	D
PM	4	Α	А	А	А	А	С	С	С	С	А	А	A	А	D	С	С	D

The following road construction will be required to provide adequate access to the development on Erf 1427 and Erf 1719 – see Figure 8 (next page).

- Extension of Road A from Road B to the southern boundary of Erf 1427
- Extension of Road C from Road B to the southern boundary of Erf 1719

The above roads should consist of 1 lane per direction, each lane at least 3m wide. As shown in the photo below, the road reserve catering for the extension of Road A is available.



Photo 1 – Road Reserve for the Southern Extension of Road A (southbound view)

A residential dwelling has unfortunately been constructed along the alignment of the southern extension of Road C. This dwelling unit will need to be relocated.



Photo 2 – Aerial View (Road C Extension)

5 PUBLIC TRANSPORT AND PEDESTRIAN FACILITIES

5.1 PUBLIC TRANSPORT FACILITIES

The residents in Garankuwa depend heavily on public transport and it can be expected that taxi routes will expand into the township as development takes place. According to the COTO Manual^(ref 3) public transport stops should be located within acceptable walking distances from generators, attractors and modal transfer facilities. Walking distances to stops should preferably be within 400m but not more than 800m.

A formal lay-by facility is available along Road B, approximately 290m west of the intersection with Road A.



Photo 3 – Existing Minibus-taxi layby along Road B

With the extension of Road A, additional lay-by facilities should be provided on either side of this road, downstream of the access to Erf 1427 and Erf 1719 – *see Figure 8*. It is also recommended that additional lay-bys be provided along the extension of Road C, at the access to Erf 1719 (also shown in *Figure 8*).

5.2 PEDESTRIAN FACILITIES

A 1.5m wide formal pedestrian walkway is currently available along the northern side of Road B. Speedhumps and pedestrian crossing facilities are also provided at various locations along Road B.



Photo 4 – Existing Pedestrian Walkway along Road B (Eastbound View along Road B)

With the southern extension of Road A and Road C, formal pedestrian walkways (at least 1.8m wide but preferably 2m wide) should be provided along the street front of Erf 1427 and Erf 1719 – also shown in *Figure 8*.



Figure 8 – Required Road Construction Including Public Transport and Pedestrian Facilities

6 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are made from this study:

6.1 CONCLUSIONS

- A subdivision application was submitted by Durapi Consulting on behalf of the City of Tshwane Human Settlements Department for Erf 1427 and Erf 1719, Garankuwa to allow 752 residential 1 erven (low income housing).
- The combined site is approximately 11.17 ha in extent and is located in the south-western area of Garankuwa.
- Low peak hour traffic volumes are currently present along the surrounding road network and no capacity constraints occur.
- The CTMM road planning for the area caters for the following:
 - The southern extension of Road A (U4(b) collector road) between Erf 1427 and Erf 1719.
 - The southern extension of Road C (U4(b) collector road) along the eastern boundary of Erf 1719.
- The road reserve for the extension of Road A is available but a dwelling unit will need to be relocated to allow the southern extension of Road C.
- The proposed township is expected to generate the following additional worst case peak hour trips:
 - Weekday AM: 384 trips (96 trips inbound and 288 trips outbound)
 - Weekday PM: 384 trips (269 trips inbound and 115 trips outbound)
- The existing road network will need to be extended to provide adequate access to the proposed township.
- A minibus-taxi layby and a formal pedestrian walkway is available along Road B (near Erf 1427 and Erf 1719).

6.2 **RECOMMENDATIONS**

It is recommended that:

- The proposed subdivision of Erf 1427 and Erf 1719 to allow 752 residential 1 erven be supported from a traffic engineering point of view.
- The following road improvements should be implemented as part of the township:
 - Installation of a traffic signal along Lucas Mangope Drive at the access to Garankuwa (Road D);
 - Extension of Road A (U4(b) Collector road) from Road B to the southern boundary of Erf 1427;
 - Extension of Road C (U4(b) Collector road) from Road B to the southern boundary of Erf 1719;
 - Construction of public transport lay-by facilities along the U4(b) collector roads at the main intersections providing access to Erf 1427 and Erf 1719.
 - Construction of the municipal road network within the township;
 - Construction of formal pedestrian walkways (preferably 2m wide) along the U4(b) collector roads along the street front of Erf 1427 and Erf 1719.

7 **REFERENCES**

- 1. Committee of Transport Officials, **TMH17, South African Trip Data Manual,** Committee Draft 2.0, May 2018.
- 2. PTV Group, **PTV Vistro 2022 (SP 0-3)**, 2022.
- 3. Committee of Transport Officials, **South African Traffic Impact and Site Traffic Assessment Manual, TMH 16,** Committee Draft 2.0, May 2018.

APPENDIX A Proposed Subdivision – Erf 1427 & Erf 1719





PROPOSED SUBDIVISION GARANKUWA ERF 1427 & Erf 1719

The figure ABCDA represents ERF 1427, Garankuwa, measuring 10,8060ha in extent proposed to be subdivided into 368 Portions. (See table below)

The figure EFGHE represents ERF 1719, Garankuwa, measuring 11,1743ha in extent. proposed to be subdivided into 384 Portions. (See table below)

ERF 14	427	ERF 1719			
ERF NO.	ERF SIZE	ERF NO.	ERF SIZE		
1	214	1, 2	213		
2 to 20	204	3 TO 11	210		
21	238	12	212		
22	202	13	214		
23 to 69	200	14 TO 22	210		
70	209	23	227		
71	270	24 TO 28	227		
72 to 76	228	29 30	218		
77.78	218	31 TO 35	227		
79 to 84	228	36	271		
85	212	37	235		
86	232	38 TO 83	200		
87 to 106	202	84	200		
107 108	218	85	274		
107,100	210	86	274		
10910120	207	97 to 01	220		
129	252	07 10 91	222		
130	252	92	230		
131 10 149	214	93 04 to 09	239		
150, 151 152 to 170	210	94 10 96	222		
152 10 170	214	99, 100	210		
171	200	101 10 120	207		
172 to 101	221	121, 122	210		
102	202	123 10 142	207		
192	200	145, 144	210		
195, 194	210	145 10 104	207		
195 196 to 214	200	167 to 186	210		
215 216	202	187 188	207		
213, 210 217 to 236	207	189 to 208	207		
217 10 200	207	209 210	218		
239 to 258	210	203, 210 211 to 230	207		
259 260	252	231 232	218		
261 to 280	207	233 to 252	206		
281 282	218	253 254	218		
283 to 302	207	255 to 274	206		
303, 304	271	275.276	218		
305 to 324	207	277 to 296	207		
325, 326	236	297. 298	208		
327 to 346	207	299 to 318	207		
347, 348	218	319, 320	218		
349 to 368	210	321 to 340	207		
L	1	341, 342	218		
		343 TO 362	207		
		363, 364	223		
		365 to 373	210		
		374, 375	202		
		376 to 384	210		

SCALE: 1: 4000 (A 3 Paper)	PLAN NO: xxxxxxx		
Town Planner: TH Strydom Pr. Pln A/2027/2015	Date: 26/07/2022		
CLIENT:			
	DURAPI CONSULTING		
CITY OF TSHWANE Igniting excellence	Tel: 011 312 8629/8599 Fax: 011 312 8638		
City of Tshwane	manjith@durapi.co.za herman@durapi.co.za		

APPENDIX B Capacity Analyses Results



Summary of Results

				So	uth			Eas	st			Nor	th			We	st	
Peak Hour	Scenario	Intersection LOS	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right
								Road	l A / Ro	ad B								
				Roa	nd A			Road	B			Roa	AL			Roa	d B	
	1	Α	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А
ΔМ	2	Α	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А
	3	Α	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А
	4	Α	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А
	1	Α	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А
РМ	2	Α	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А
	3	Α	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А
	4	Α	А	А	А	А	А	А	А	A	А	Α	А	А	А	А	А	А
								Road	l B / Ro	ad C								
				Roa	nd C			Road	B			Roa	H C			Roa	d B	
	1	Α	-	-	-	-	А	-	А	A	А	Α	-	Α	А	А	А	-
АМ	2	Α	-	-	-	-	А	-	А	A	А	Α	-	Α	А	А	А	-
	3	Α	А	А	А	А	А	А	А	A	А	Α	А	А	А	А	А	А
	4	Α	А	А	А	А	А	А	А	A	А	Α	А	А	А	А	А	А
	1	Α	-	-	-	-	А	-	А	А	А	А	-	А	А	А	А	-
РМ	2	Α	-	-	-	-	A	-	A	A	А	A	-	A	A	А	А	-
	3	Α	А	A	А	А	A	А	A	A	А	A	A	A	A	А	А	А
	4	A	Α	A	Α	A	A	Α	A	A	А	A	A	A	Α	A	А	A
								Road	l B / Ro	ad D								
				Roa	nd D			Road	B			Road	d D			Roa	d B	
	1	Α	A	A	A	A	A	A	A	A	A	A	A	A	A	А	А	A
AM	2	Α	A	A	A	A	A	A	A	A	A	A	A	A	A	А	А	A
	3	Α	A	A	A	A	A	A	A	A	A	A	A	A	A	А	А	A
	4	Α	A	A	A	A	А	A	A	A	A	A	A	A	A	A	А	А
	1	Α	A	A	A	A	A	A	A	A	A	A	A	A	A	А	А	A
РМ	2	Α	A	A	Α	A	A	Α	A	A	А	A	A	A	A	А	А	А
	3	Α	A	A	А	А	A	А	A	A	А	A	А	A	A	А	А	А
	4	Α	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А

Summary of Results

				So	uth			Eas	st			Nor	th			We	est	
Peak Hour	Scenario	Intersection LOS	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right
							Road	I D / Lu	cas Mar	ngope	Drive							
			Luca	is Man	gope D	rive		Road	d D		Luca	as Mang	jope Dr	ive		Roa	d D	
	1	F	F	F	F	F	В	В	В	В	F	F	F	F	F	F	F	F
лм	2	F	F	F	F	F	В	В	В	В	F	F	F	F	F	F	F	F
AW	3	F	F	F	F	F	В	В	В	В	F	F	F	F	F	F	F	F
	4	F	F	F	F	F	В	В	В	В	F	F	F	F	F	F	F	F
	1	F	F	F	F	F	В	В	В	В	Е	E	Е	Е	С	С	С	С
РМ	2	F	F	F	F	F	В	В	В	В	F	F	F	F	D	D	D	D
r ivi	3	F	F	F	F	F	В	В	В	В	Е	Е	Е	Е	D	D	D	D
	4	F	F	F	F	F	В	В	В	В	F	F	F	F	E	Е	E	Е
							R	load B	/ Rahub	e Stre	et				•			
				Roa	d B		F	Rahube	Drive			Roa	B			Rahub	e Drive	
	1	Α	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А	А
ΔМ	2	Α	А	A	А	А	А	А	А	A	А	А	А	А	А	А	А	А
,	3	Α	А	A	А	А	А	А	А	A	А	А	А	А	А	А	А	А
	4	Α	А	A	А	А	А	А	А	A	А	А	А	А	А	А	А	А
	1	Α	А	A	А	А	А	А	А	A	А	А	А	А	А	А	А	А
РМ	2	Α	A	A	А	А	А	А	A	A	А	А	А	А	A	А	А	А
	3	Α	A	А	А	А	А	А	А	A	А	А	А	А	A	А	А	А
	4	A	Α	А	А	А	А	Α	Α	Α	А	Α	А	Α	Α	А	А	А
							Ral	hube S	treet / M	ain St	reet							
				Main	Street		F	Rahube	Drive			Main S	treet			Rahub	e Drive	1
	1	В	А	-	А	А	В	Α	-	В	А	А	А	-	-	-	-	-
АМ	2	В	А	-	А	А	В	В	-	В	А	А	А	-	-	-	-	-
	3	В	А	-	А	А	В	В	-	В	А	А	А	-	-	-	-	-
	4	В	А	-	А	А	В	В	-	В	А	А	А	-	-	-	-	-
	1	В	A	-	А	А	В	Α	-	В	А	Α	А	-	-	-	-	-
РМ	2	В	A	-	А	А	В	В	-	В	А	Α	А	-	-	-	-	-
	3	В	A	-	А	А	В	В	-	С	А	А	А	-	-	-	-	-
	4	В	А	-	А	А	В	В	-	С	А	А	А	-	-	-	-	-

2027 Weekday AM With Erf 1427 & Erf 1719

Intersection of Road A and Road B

2027 Weekday AM with Erf 1427 and Erf 1719

Number							1					
Intersection						Road A	/Road B					
Notes												
Control Type						All-wa	ay stop					
Analysis Method						HCM 7t	h Edition					
Name		Road A			Road A			Road B			Road B	
Show Name		۲ź			52			52			52	
Approach		Northbound			Southbound			Eastbound			Westbound	
Lane Configuration		+			+			+			+	
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Base Volume Input [veh/h]	0	4	1	16	0	16	11	58	0	1	34	21
Total Analysis Volume [veh/h]	112	21	<i>96</i>	21	4	21	14	74	38	32	43	27
Movement, Approach, & Inter	section Res	ults										
Average Lane Delay [s/veh]		8.90			7.81			<i>8.55</i>			8.22	
95th-Percentile Queue Length [veh]		1.11			0.18			0.58			0.44	
95th-Percentile Queue Length [m]		8.46			1.40			4.41			3.37	
Approach Delay [s/veh]		8.90			7.81			8.55			8.22	
Approach LOS		Α			Α			Α			Α	
Intersection Delay [s/veh]						8	.57					
Intersection LOS							A					
Calculation converged						Yes (after	3 iterations)					

Number							1					
Intersection						Road A	/Road B					
Notes												
Control Type						All-wa	ay stop					
Analysis Method						HCM 7t	h Edition					
Name		Road A			Road A			Road B			Road B	
Show Name	lame 🖸				۲ú			۲ú			۲ú	
Approach	Northbound				Southbound			Eastbound			Westbound	
Lane Configuration		+			+			+			+	
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Base Volume Input [veh/h]	2	12	6	12	0	6	5	38	4	14	38	14
Total Analysis Volume [veh/h]	48	22	44	16	16	8	7	49	110	107	49	18
V Movement, Approach, & Inters	section Resu	lts										
Average Lane Delay [s/veh]		8.30			7.86			8.77			8.13	
95th-Percentile Queue Length [veh]		0.50			0.16			0.79			0.74	
95th-Percentile Queue Length [m]		3.81			1.23			6.03			5.62	
Approach Delay [s/veh]		8.30			7.86			8.77			8.13	
Approach LOS		Α			Α			Α			Α	
Intersection Delay [s/veh]						8.	36					
Intersection LOS							A					
Calculation converged						Yes (after .	3 iterations)					

Intersection of Road B and Road C

202	27 W	eekd	ay A	M wi	th Er	f 142	27 an	d Erf	1719	3		
Number	ĺ					2	25					
Intersection						Road B	/RoadC					
Notes												
Control Type						All-wa	ay stop					
Analysis Method						HCM 7t	h Edition					
Name	Road C Road B Road B Road B											
Show Name									52			
Approach		Northbound			Southbound			Eastbound			Westbound	
Lane Configuration		+			+			+			+	
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Base Volume Input [veh/h]	0	0	0	8	0	6	14	64	0	0	50	10
Total Analysis Volume [veh/h]	0	0	98	10	0	8	18	177	0	32	96	13
	section Res	ults										
Average Lane Delay [s/veh]		8.61			7.64			8.59			8.15	
95th-Percentile Queue Length [veh]		0.46			0.07			0.90			0.60	
95th-Percentile Queue Length [m]		3.48			0.53			6.85			4.58	
Approach Delay [s/veh]		8.61			7.64			8.59			8.15	
Approach LOS		Α			Α			Α			Α	
Intersection Delay [s/veh]						8	42					
Intersection LOS							A					
Calculation converged						Yes (after	3 iterations)					

Number						2	25					
Intersection						Road B	/RoadC					
Notes												
Control Type						All-wa	ay stop					
Analysis Method						HCM 7t	h Edition					
Name		Road C			Road C			Road B			Road B	
Show Name	lame 🖬				52			52			52	
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	pproach Northbound ane Configuration				+			+			+	
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Base Volume Input [veh/h]	0	0	0	2	0	7	3	53	0	0	62	7
Total Analysis Volume [veh/h]	0	0	39	2	0	9	3	104	0	92	169	9
Movement, Approach, & Inter	section Res	ults										
Average Lane Delay [s/veh]		8.18			7.87			7.88			8.59	
95th-Percentile Queue Length [veh]		0.17			0.04			0.43			1.24	
95th-Percentile Queue Length [m]		1.28			0.34			3.30			9.44	
Approach Delay [s/veh]		8.18			7.87			7.88			8.59	
Approach LOS		Α			Α			Α			Α	
Intersection Delay [s/veh]						8	35					
Intersection LOS							A					
Calculation converged						Yes (after	3 iterations)	l i i i i i i i i i i i i i i i i i i i				

Intersection of Road B and Road D

202	27 Wa	eekd	ay A	M wi	th Er	f 142	7 an	d Erf	1719	9		
Number						99	8004					
Intersection						Road B	/Road D					
Notes												
Control Type						Roun	dabout					
Analysis Method						HCM 7t	h Edition					
Name	Road D Road B Road B Road B											
Show Name												
Approach		Northbound			Southbound	I		Eastbound			Westbound	
Lane Configuration		+			+			+			+	
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Base Volume Input [veh/h]	43	187	12	19	241	3	4	12	64	44	14	10
Total Analysis Volume [veh/h]	114	241	16	24	310	3	6	31	259	57	22	13
Movement, Approach, & Inter	section Res	ults										
Average Lane Delay [s/veh]		5.16			7.01			6.20			5.91	
Lane LOS		A			A			A			A	
95th-Percentile Queue Length [veh]		1.15			1.48			1.17			0.41	
95th-Percentile Queue Length [m]		8.78			11.25			8.89			3.09	
Approach Delay [s/veh]		5.16			7.01			6.20			5.91	
Approach LOS		Α			Α			Α			Α	
Intersection Delay [s/veh]						6.	07					
Intersection LOS							4					

Number						998	3004					
Intersection						Road B	/Road D					
Notes												
Control Type						Round	dabout					
Analysis Method						HCM 7t	h Edition					
Name		Road D			Road D			Road B			Road B	
Show Name		۲2í			۲2í			52			۲ <u>۵</u>	
Approach		Northbound			Southbound			Eastbound			Westbound	
Lane Configuration		+			+			+			+	
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Base Volume Input [veh/h]	75	160	22	13	64	3	4	15	27	19	19	12
Total Analysis Volume [veh/h]	262	206	29	17	82	3	6	26	103	24	40	16
✓ Movement, Approach, & Inter	section Res	ults										
Average Lane Delay [s/veh]		6.39			3.79			4.49			3.75	
Lane LOS		A			A			A			A	
95th-Percentile Queue Length [veh]		1.82			0.28			0.43			0.23	
95th-Percentile Queue Length [m]		13.91			2.17			3.29			1.72	
Approach Delay [s/veh]		6.39			3.79			4.49			3.75	
Approach LOS		Α			Α			Α			Α	
Intersection Delay [s/veh]						5.	49					
Intersection LOS							4					

Intersection of Road D and Lucas Mangope Drive

Number						2	3					
ntersection					Luca	as Mangop	e Drive / Roa	d D				
lotes												
Control Type						All-wa	ay stop					
Analysis Method						HCM 7t	h Edition					
lame	Luca	s Mangope I	Drive	Luca	s Mangope [Drive		Road D			Road D	
Show Name		۲ű			۲2í			۲2í			۲2í	
Approach		Northbound			Southbound		E	Eastbound			Westbound	
ane Configuration		HIL			HIL			٦r			חור	
urning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Righ
ase Volume Input [veh/h]	258	847	26	13	1407	8	16	14	357	13	13	3
otal Analysis Volume [veh/h]	356	1034	32	16	1717	20	51	32	558	16	20	3
Movement, Approach, & Inte	rsection Res	ults								•		
verage Lane Delay [s/yeh]	342.22	373.08	13.20	567.14	568.54	12.88	15.02		322.27	14.28	15.21	15.
5th-Percentile Queue Length [veh]	41.72	43.47	0.28	64.10	64.16	0.17	0.83		33.28	0.15	0.21	01
5th-Percentile Queue Length [m]	317.94	331.22	2.12	488.45	188 94	1.29	6.36		253.58	1 17	1.58	0.0
pproach Delay [e/yeb]	517.54	3/9 90	2.72	400.40	561.51	1.20	0.00	282.48	200.00	1.17	14.82	0.2
epresed LOS		545.50 E			501.51 E			202.40 E			14.02 D	
pproach LOS						12	1 52				D	
tersection Delay [s/ven]						40	T.32					
Intersection LUS							F					
20	27 W	eekd	ay P	M wit	th Er	f 142	7 and	I Eri	f 1719	9		
20	27 W(eekd	ay P	M wit	th Er	f 142	7 anc	l Ert	f 1719	9		
20 umber	27 W(eekd	ay P	M wit	th Er	f 142	27 anc	l Eri	f 1719	9		
20 lumber itersection	27 W(eekd	ay P	M wit	th Er	f 142 2 ie Makinta	2 7 anc 29 Highway / Ro	l Er ad D	f 1719	9		
20 lumber itersection lotes	27 W	eekd	ay P	<u>M wi</u> t	th Er	f 142 2 ie Makinta	27 and 29 Highway / Ro	i Er i	f 1719	9		
20 lumber itersection lotes iontrol Type	27 W(eekd	ay P	<u>M wi</u> t	th Er	f 142 2 ie Makinta All-wa	27 and 29 Highway / Ro	i Er i	f 1719	9		
20 lumber ttersection lotes control Type nalysis Method	27 W(eekd	ay P	<u>M wi</u> t	th Er Molei	<mark>f 142</mark> 2 ie Makinta All-wa HCM 7tt	27 and 29 Highway / Ro ay stop h Edition	i Er i	f 1719	9		
20 lumber ntersection lotes control Type nalysis Method lame	27 W(eekd Makinta Hig	ay P	<u>M wit</u>	th Er Molei Makinta Hig	f 142 2 fe Makinta All-wa HCM 7th ghway	27 and 29 Highway / Ro ay stop h Edition	ad D Road D	f 1719	9	Road D	
20 umber tersection otes ontrol Type nalysis Method ame how Name	27 W(eekd	ay P	<u>M wit</u> Molefe	th Er Molet Makinta Hig	f 142 2 fe Makinta All-wa HCM 7tl ghway	27 and 29 Highway / Ro ay stop h Edition	ad D Road D	f 1719	9	Road D 10	
20 umber tersection otes ontrol Type nalysis Method ame how Name pproach	27 W(eekd Makinta Hig Northound	ay P	<u>M wit</u>	th Er Molet Makinta Hig Southbound	<mark>f 142</mark> Z e Makinta All-wa HCM 7th ghway	27 and 29 Highway / Ro ay stop h Edition	ad D Road D Co Co Co	f 1719	9	Road D CÍ Westbound	
20 umber tersection otes ontrol Type nalysis Method ame now Name oproach ane Configuration	27 W(eekd Makinta Hig Ø Northbound	ay P	M wit	th Er Molet Makinta Hig Southbound	f 142 2 fe Makinta All-wa HCM 7tt ghway	7 anc Highway / Ro hy stop h Edition E	Road D Sold D Sold Castbound	F 171	9	Road D to Westbound	
20 umber itersection otes ontrol Type nalysis Method ame how Name pproach ane Configuration urning Movement	27 Wo Molefe	eekd Makinta Hig to Northbound	ay P ghway <i>Right</i>	M wit	th Er Molet Makinta Hig Southbound	f 142 2 ie Makinta All-wa HCM 7tl ghway <i>Right</i>	Tanc Highway / Ro ay stop h Edition E <i>Left</i>	Road D Road D C astbound Thru	F 171	9 Left	Road D Cí Westbound Thru	Rig
20 umber tersection otes ontrol Type nalysis Method ame tow Name oproach ane Configuration urning Movement ase Volume Input [veh/h]	27 W(Molefe	eekd Makinta Hig cí Northbound tir <i>Thru</i> 1273	ay P ghway <i>Right</i> 19	M with Molefe	th Er Molet Makinta Hig Southbound Thru 706	f 142 2 fe Makinta All-wa HCM 7tl ghway <i>Right</i> 12	T anc Highway / Ro hy stop h Edition E Left 11	Road D For Thru Thru Tastbound	F 171(<i>Right</i> 185	9 	Road D C Westbound Thru 9	Rigg
20 umber tersection btes ontrol Type ialysis Method ame tow Name sproach une Configuration uning Movement use Volume Input [veh/h] tal Analysis Volume [veh/h]	27 Wo Molefe	eekd Makinta Hig Cí Northbound Thru 1273 1554	ay P ghway Right 19 23	Molefe Left 8 9	th Er Molet Makinta Hig Southbound Thru 706 861	f 142 2 fe Makinta All-wa HCM 7tl ghway <i>Right</i> 12 43	T anc Highway / Ro h Edition Left 11 26	Road D For Thru 13 22	F 1719	9 <i>Left</i> 11 14	Road D Cí Westbound Thru 9 25	Rig 3 3
20 umber tersection ootes ontrol Type halysis Method ame now Name oproach ane Configuration uming Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] Movement, Approach, & Inter Movement, Approach, & Inter	Molefe Left 321 505	eekd Makinta Hig cí Northbound tfr Thru 1273 1554 ults	ghway Right 19 23	Molefe Left 8 9	th Er Molet Makinta Hig Southbound Thru 706 861	f 142 2 fe Makinta All-wa HCM 7tl ghway Right 12 43	The second secon	Road D For Thru 13 22	F 1719	9 <i>Left</i> 11 74	Road D C Westbound Thru 9 25	Rig 3 3
20 umber tersection otes ontrol Type nalysis Method ame how Name pproach ane Configuration urning Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] Movement, Approach, & Inter verage Lane Delay [s/veh]	27 W(Molefe Left 321 505 rsection Res 652.29	eekd Makinta Hig C Northbound Thru 1273 1554 Ults 696.40	ay P ghway <i>Right</i> 19 23 12.48	M wit Molefe	th Er Molet Makinta Hig Southbound thr Thru 706 861 87.25	f 142 2 fe Makinta All-wa HCM 7tl ghway <i>Right</i> 12 43 13.00	29 Highway / Ro hy stop h Edition <i>Left</i> 11 26	Road D For the second	F 1719	9 <i>Left</i> 11 14	Road D C Westbound Thru 9 25 14.88	<i>Rig</i> 3 3 14.
20 umber tersection otes ontrol Type nalysis Method ame how Name pproach ane Configuration urning Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] Movement, Approach, & Inter verage Lane Delay [s/veh] 5th-Percentile Queue Length [veh]	27 W(Molefe Left 321 505 rsection Res 652.29 79.77	eekd Makinta Hig ci Northbound titr Thru 1273 1554 ults 696.40 81.74	ay P ghway Right 19 23 12.48 0.19	M with Molefe	th Er Molet Makinta Hig Cú Southbound tfr Thru 706 861 87.25 14.10	f 142 2 fe Makinta All-wa HCM 7tl ghway <i>Right</i> 12 43 13.00 0.37	29 Highway / Ro by stop h Edition Left 11 26 13.88 0.44	Road D Ed Eastbound Thru 13 22	F 1719 Right 185 272 44.79 6.72	2 Left 11 14 13.70 0.13	Road D CÍ Westbound Thru 9 25 14.88 0.25	<i>Rig</i> 3 3 3 14.
20 umber tersection otes ontrol Type nalysis Method ame how Name pproach ane Configuration urning Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] Movement, Approach, & Inter verage Lane Delay [s/veh] 5th-Percentile Queue Length [veh] 5th-Percentile Queue Length [m]	27 W(Molefe Left 321 505 rsection Res 652.29 79.77 607.82	eekd Makinta Hig cl Northbound ← ↑ ↑ ↑ <i>Thru</i> 1273 1554 ults 696,40 81.74 622.86	ay P ghway Right 19 23 12.48 0.19 1.42	M with Molefe Left 8 9 86.68 14.05 107.05	th Er Molet Makinta Hig Cú Southbound tfr Thru 706 861 87.25 14.10 107.41	f 142 2 7 7 8 7 8 7 9 1 9 1 9 1 2 7 9 1 3 00 0.37 2.79	29 Highway / Ro by stop h Edition <i>Left</i> 11 26 <i>13.88</i> 0.44 3.37	Road D For the second	F 1719 Right 185 272 44.79 6.72 51.19	9 Left 11 14 13.70 0.13 0.97	Road D C Westbound Thru 9 25 14.88 0.25 1.92	<i>Rig</i> 3 3 3 14.1 0.0 0.0
20 umber tersection otes ontrol Type halysis Method ame now Name oproach ane Configuration uming Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] Variage Lane Delay [s/veh] oth-Percentile Queue Length [weh] oth-Percentile Queue Length [m] pproach Delay [s/veh]	27 W(Molefe Left 321 505 rsection Res 652.29 79.77 607.82	eekd Makinta Hig cí Northbound ↑↑↑↑ <i>Thru</i> 1273 1554 ults 696.40 81.74 622.86 667.03	ay P ghway Right 19 23 12.48 0.19 1.42	M with Molefe Left 8 9 86.68 14.05 107.05	th Er Molet Makinta Hig Cú Southbound ← tr Thru 706 861 87.25 14.10 107.41 83.48	f 142 2 7 7 8 7 8 7 8 7 9 7 7 9 7 7 9 7 7 9 7 7 9	27 anc 29 Highway / Ro ay stop h Edition Edition Edition Edition 11 26 13.88 0.44 3.37	Road D For the second	Right 185 272 44.79 6.72 51.19	2 Left 11 14 13.70 0.13 0.97	Road D CÍ Westbound Thru 9 25 14.88 0.25 1.92 14.46	<i>Rig</i> 3 3 3 14.3 0.0 0.2
20 umber tersection otes ontrol Type nalysis Method ame how Name pproach ane Configuration urning Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] Movement, Approach, & Inter werage Lane Delay [s/veh] 5th-Percentile Queue Length [weh] 5th-Percentile Queue Length [m] pproach Delay [s/veh] pproach Delay [s/veh]	27 W(Molefe Left 321 505 rsection Ress 652.29 79.77 607.82	eekd Makinta Hig C Northbound ↑↑↑↑ <i>Thru</i> 1273 1554 Ults 696.40 81.74 622.86 667.03 F	ay P ghway Right 19 23 12.48 0.19 1.42	M wit Molefe Left 8 9 86.68 14.05 107.05	th Er Molet Makinta Hig Co Southbound ← Thru 706 861 87.25 14.10 107.41 83.48 F	f 142 2 fe Makinta All-way HCM 7tl ghway Right 12 43 13.00 0.37 2.79	27 anc 29 Highway / Ro ay stop h Edition E Left 11 26 13.88 0.44 3.37	And D Road D C Thru 13 22 40.15 E	F 1719 Right 185 272 44.79 6.72 51.19	9 <i>Left</i> 11 14 <i>13.70</i> <i>0.13</i> <i>0.97</i>	Road D C/ Westbound Thru 9 25 14.88 0.25 1.32 14.46 B	Rig 3 3 14.3 0.0 0.2
20 umber tersection otes ontrol Type halysis Method ame how Name oproach ane Configuration urning Movement ase Volume Input [veh/h] tal Analysis Volume [veh/h] Movement, Approach, & Inter verage Lane Delay [s/veh] 5th-Percentile Queue Length [weh] 5th-Percentile Queue Length [m] pproach Delay [s/veh] pproach LOS tersection Delay [s/veh]	27 W(Molefe Left 321 505 rsection Ress 652.29 79.77 607.82	eekd Makinta Hig cí Northbound Thru 1273 1554 Uts 696.40 81.74 622.86 667.03 F	ay P shway Right 19 23 12.48 0.19 1.42	M wit Molefe Left 8 9 86.68 14.05 107.05	th Er Molet Makinta Hig cí Southbound t↑↑↑ Thru 706 861 87.25 14.10 107.41 83.48 F	f 142 2 fe Makinta All-wa HCM 7tl ghway Right 12 43 13.00 0.37 2.79	27 anc 29 Highway / Ro ay stop h Edition E Left 11 26 13.88 0.44 3.37 0.40	A Ert A D Road D C Thru 13 22 40.15 E	F 1719 Right 185 272 44.79 6.72 51.19	9 Left 11 14 13.70 0.13 0.97	Road D Cí Westbound Thru 9 25 14.88 0.25 1.92 14.46 B	Rig 3 3 14. 0.0
20 umber tersection otes ontrol Type nalysis Method ame now Name oproach ane Configuration urning Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] V Movement, Approach, & Inter verage Lane Delay [s/veh] 5th-Percentile Queue Length [veh] 5th-Percentile Queue Length [m] pproach Delay [s/veh] pproach LOS tersection Delay [s/veh]	27 W(Molefe 221 321 505 rsection Ress 652.29 79.77 607.82	eekd Makinta Hig €0 Northbound 1273 1554 ults 696.40 81.74 622.86 667.03 F	ay P phway Right 19 23 12.48 0.19 1.42	M wit Molefe Left 8 9 86.68 14.05 107.05	th Er Molet Makinta Hig C Southbound ← Thru 706 861 87.25 14.10 107.41 83.48 F	f 142 2 fe Makinta All-wa HCM 7tl ghway Right 12 43 13.00 0.37 2.79	27 anc 29 Highway / Ro ay stop h Edition E Left 11 26 13.88 0.44 3.37 0.40 F	A Ert A D Road D C Eastbound Thru 13 22 40.15 E	F 1719 Right 185 272 44.79 6.72 51.19	9 Left 11 14 13.70 0.13 0.97	Road D CÍ Westbound Thru 9 25 14.88 0.25 1.92 14.46 B	Rig 3 3 14. 0.0

Intersection of Road B and Rahube Street

Number							11					
ntersection						Road B/Ra	hube Stre	et				
lotes												
Control Type						All-wa	ay stop					
analysis Method						HCM 7t	h Edition					
lame		Road B			Road B		F	Rahube Stre	et	F	Rahube Stree	et
how Name		۲2í			۲2í			۲2í			52	
pproach		Northbound			Southbound			Eastbound			Westbound	
ane Configuration		+			+			+			+	
urning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Righ
ase Volume Input [veh/h]	28	20	7	3	35	73	50	15	30	4	10	10
otal Analysis Volume [veh/h]	148	26	9	3	46	94	64	19	77	6	13	13
Movement, Approach, & Inte	arsection Res	ults					•			•		
verage Lane Delay [s/veh]		8.14			8.77			8.70			8.04	
5th-Percentile Queue Length [veh]		0.78			0.68			0.75			0.13	
5th-Percentile Queue Length [m]		5.93			5.20			5.74			1.02	
pproach Delay [s/veh]		8.14			8.77			8.70			8.04	
pproach LOS		A			A			A			A	
tersection Delay [s/yeh]		~			~	8	48			I	~	
tersection LOS						-	4					
alculation converged						Vec /after	2 iteratione)					
	27 \\\\	ookd	ov D		th Er	f 1/10	7 00	d Erf	- 171	0		
20	27 W	eekd	ay P	M wi	<u>th Er</u>	f 142	27 an	<u>d Er</u> t	f 171	9		
20 umber	<u>27 W</u>	eekd	ay P	<u>M wi</u>	th Er	f 142	27 an	d Eri	171	9		
20 lumber itersection	<u>27 W</u>	eekd	ay P	<u>M wi</u>	th Er	f 142	7 an	d Eri	f 171	9		
20 umber itersection lotes	<u>27 W</u>	eekd	ay P	M wi	th Er	f 142	?7 an	d Er	f 171	9		
20 umber tersection otes ontrol Type	27 W	eekd	ay P	M wi	th Er	f 142 Road B / Ra All-wa	27 an	d Er	f 171	9		
20 umber tersection otes ontrol Type nalysis Method	<u>27 W</u>	eekd	ay P	M wi	th Er	f 142 Road B/Ra All-wa HCM 7t	27 an 11 ahube Stree ay stop h Edition	d Eri	f 171	9		
20 umber tersection otes ontrol Type nalysis Method ame	<u>27 W</u>	eekd Road B	ay P	M wi	th Er	f 142 Road B / Ra All-wa HCM 7t	27 an 11 ahube Stree ay stop h Edition F	d Er et Rahube Stre	171	9	Rahube Stree	et
20 umber tersection otes ontrol Type nalysis Method ame how Name	<u>27 W</u>	Road B	ay P	<u>M wi</u>	th Er	f 142 Road B / Ra All-wa HCM 7t	27 an 77 ahube Stree ay stop h Edition F	d Eri et Rahube Stre	F 171	9	Rahube Stree	et
20 umber itersection otes ontrol Type nalysis Method ame how Name pproach	27 W	Road B	ay P	M wi	Road B C/ Southbound	f 142 Road B / Ra All-wa HCM 7t	27 an 11 an hube Stree ay stop h Edition F	d Eri et Rahube Stre Cú Eastbound	F 171	9	Rahube Stree	et
20 umber tersection otes ontrol Type nalysis Method ame how Name pproach ane Configuration	27 W(Road B C Northbound	ay P	<u>M wi</u>	Road B € Southbounc	f 142 Road B / Ra All-wa HCM 7t	27 an 17 ahube Stre ay stop h Edition F	d Erf et Rahube Stre € Eastbound	et	9	Rahube Strer ℃/ Westbound	et
20 umber tersection otes ontrol Type nalysis Method ame how Name pproach ane Configuration urning Movement	27 W(Road B S Northbound Thru	ay P	<u>M wi</u>	Road B € Southbound Thru	f 142 Road B / Ra All-wa HCM 7t Right	27 an 17 shube Stree ay stop h Edition F Left	d Ert et Rahube Stre €d Eastbound thru	et <i>Right</i>	9 Left	Rahube Stree ℃ Westbound ← Thru	et Rigi
20 umber tersection otes ontrol Type nalysis Method ame tow Name oproach une Configuration urning Movement ase Volume Input [veh/h]	27 W(Road B C Northbound Thru 13	Right 2	<u>Left</u>	Road B C/ Southbound Thru 20	f 142 Road B / Ra All-wa HCM 7t Right 75	27 an 17 ahube Stree ay stop h Edition F Left 90	d Ert et Rahube Stre €d Eastbound Thru 25	et <i>Right</i>	9 Left 2	Rahube Stree C Westbound Thru 8	et <i>Rig</i> g5
20 umber tersection otes ontrol Type halysis Method ame now Name oproach une Configuration urning Movement use Volume Input [veh/h] otal Analysis Volume [veh/h]	27 W(Road B Cá Northbound Thru 13 17	Right 2 2	<u>Left</u> 3 3	Road B C/ Southbound Thru 20 26	f 142 Road B / Ra All-wa HCM 7t Right 75 97	27 an 11 ahube Stree ay stop h Edition F Left 90 116	d Ert et Rahube Stre €/ Eastbound Thru 25 32	et <i>Right</i> 30 143	9 Left 2 2	Rahube Street Westbound Thru 8 10	et <i>Rig</i> <i>7</i>
20 umber tersection otes ontrol Type halysis Method ame now Name oproach une Configuration urning Movement use Volume Input [veh/h] tse Volume Input [veh/h]	27 W(Road B Cd Northbound Thru 13 17	Right 2 2	<u>Left</u> 3 3	Road B C/ Southbound Thru 20 26	f 142 Road B / Ra All-wa HCM 7t Right 75 97	27 an 11 ahube Stree ay stop h Edition F Left 90 116	d Ert et Rahube Stre €⁄ú Eastbound Thru 25 32	et <i>Right</i> 30 143	9 Left 2 2	Rahube Strer CÍ Westbound Thru 8 10	et <i>Rigg</i> 5 7
20 umber tersection otes ontrol Type halysis Method ame how Name oproach ane Configuration urning Movement ase Volume Input [veh/h] tal Analysis Volume [veh/h] Movement, Approach, & Inter were of Local Delay (Auch)	Left 25 78 Exsection Result	Road B C Northbound Thru 13 17 ults 7.99	Right 2 2	<u>Left</u> 3 3	Road B Cd Southbound Thru 20 26	f 142 Road B / Ra All-wa HCM 7t Right 75 97	27 an 17 ahube Stree ay stop h Edition F Left 90 116	d Er1 et Rahube Stre €/ Eastbound Thru 25 32 2657	et <i>Right</i> 30 143	9 Left 2 2	Rahube Stree CÍ Westbound Thru 8 10 202	et <i>Rig</i> 5 7
20 umber tersection otes ontrol Type nalysis Method ame how Name oproach ane Configuration urning Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] 7 Movement, Approach, & Inter verage Lane Delay [s/veh]	Left 25 78 resection Rese	Road B C Northbound Thru 13 17 Ults 7.89 0.29	Right 2 2	Left 3 3	Road B ⊈ Southbound Thru 20 26 8,90 AGC	f 142 Road B / Ra All-wa HCM 7t Right 75 97	27 an 11 ahube Stree ay stop h Edition F Left 90 116	d Er1 et Rahube Stre € Eastbound Thru 25 32 9,67 1,52	et <i>Right</i> 30 143	9 Left 2 2	Rahube Stree CÍ Westbound Thru 8 10 7.93 0.02	et <i>Rig</i> 5 7
20 umber tersection otes ontrol Type halysis Method ame now Name oproach ane Configuration urning Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] Movement, Approach, & Inte rerage Lane Delay [s/veh] ith-Percentile Queue Length [veh]	Left 25 78 Exection Rese	Road B CI Northbound Thru 13 17 Ults 7.89 0.39	Right 2 2	Left 3 3	Road B ⊈ Southbound Thru 20 26 8.90 0.67	f 142 Road B / Ra All-wa HCM 7t Right 75 97	27 an 11 ahube Stree ay stop h Edition F Left 90 116	d Er1 et Rahube Stree €/ Eastbound ↑ 7hru 25 32 9.67 1.58 12.27	et <i>Right</i> 30 143	9 Left 2 2	Rahube Stree ☑ Westbound Thru 8 10 7.93 0.08 0.05	et <i>Rigi</i> 5 7
20 umber tersection tets outrol Type nalysis Method ame now Name proach ane Configuration urning Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] Movement, Approach, & Inter rerage Lane Delay [s/veh] th-Percentile Queue Length [veh] ith-Percentile Queue Length [m]	27 W(Left 25 78 rsection Resu	Road B CI Northbound Thru 13 17 Valts 7.89 0.39 3.00	Right 2 2	Left 3 3	Road B €⁄ Southbound Thru 20 26 8.90 0.61 4.69	f 142 Road B / Ra All-wa HCM 7t Right 75 97	27 an 71 ahube Stree ay stop h Edition F Left 90 716	d Er1 et Rahube Stre €⁄ú Eastbound Thru 25 32 9,67 1.58 12.07	et <i>Right</i> 30 143	9 Left 2 2	Rahube Stree CA Westbound Thru 8 10 7.93 0.08 0.59 0.59	et <i>Rig</i> igi 5 7
20 umber tersection otes ontrol Type nalysis Method ame how Name pproach ane Configuration urning Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] Movement, Approach, & Interverse verage Lane Delay [s/veh] 5th-Percentile Queue Length [veh] 5th-Percentile Queue Length [m] pproach Delay [s/veh]	27 W(Road B Cl Northbound Thru 13 17 ults 7.89 0.39 3.00 7.89 3.00 7.89	Right 2 2	Left 3 3	Road B €⁄a Southbound Thru 20 26 8.90 0.61 4.69 8.90	f 142 Road B / Ra All-wa HCM 7t Right 75 97	27 an 71 ahube Stree ay stop h Edition F Left 90 716	d Er1 et Rahube Stre €⁄⁄ Eastbound 17hru 25 32 9,67 1,58 12,07 9,67 9,67	et <i>Right</i> 30 143	9 Left 2 2	Rahube Stree	et <i>Rigg</i> 5 7
20 umber tersection otes ontrol Type nalysis Method ame how Name pproach ane Configuration urning Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] Movement, Approach, & Inter verage Lane Delay [s/veh] oth-Percentile Queue Length [veh] oth-Percentile Queue Length [m] opproach Delay [s/veh] opproach LOS	27 W(Road B C/ Northbound Thru 13 17 Ults 7.89 0.39 3.00 7.89 A	Right 2 2	Left 3 3	Road B Ca Southbound Thru 20 26 8.90 0.61 4.69 8.90 A	f 142 Road B / Ra All-wa HCM 7t Right 75 97	27 an 11 ahube Stree ay stop h Edition F Left 90 116	d Er1 et Rahube Stre €d Eastbound Thru 25 32 9.67 1.58 12.07 9.67 A	et <i>Right</i> 30 143	9 <i>Left</i> 2 2	Rahube Stree 24 Westbound Thru 8 10 7.93 0.08 0.59 7.93 A	et <i>Rig</i> 5 7
20 umber tersection otes ontrol Type halysis Method ame how Name opproach ane Configuration uming Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] 7 Movement, Approach, & Inter verage Lane Delay [s/veh] oproach Delay [s/veh] oproach LOS tersection Delay [s/veh]	27 W(Road B C/ Northbound Thru 13 177 ults 7.89 0.39 3.00 7.89 A	Ay P	Left	Road B Cd Southbound Thru 20 26 8.90 0.61 4.69 8.90 A	f 142 Road B / Ra All-wa HCM 7t Right 75 97	27 an 11 ahube Stree ay stop h Edition F Left 90 116 10	d Ert at Rahube Stre £ 50 1.58 12.07 9.67 A	et <i>Right</i> 30 143	9 Left 2 2	Rahube Street C/ Westbound Thru 8 10 7.93 0.08 0.59 7.93 A	et <i>Rigi</i> 5 <i>7</i>
20 umber tersection otes ontrol Type nalysis Method ame how Name pproach ane Configuration urning Movement ase Volume Input [veh/h] otal Analysis Volume [veh/h] otal Analysis Volume [veh/h] Movement, Approach, & Inter verage Lane Delay [s/veh] oth-Percentile Queue Length [veh] oth-Percentile Queue Length [veh] oth-Percentile Queue Length [veh] oth-Percentile Queue Length [m] pproach Delay [s/veh] pproach LOS tersection Delay [s/veh]	27 W(Road B Cí Northbound Thru 13 17 ults 7.89 0.39 3.00 7.89 A	Right 2 2	Left 3 3	Road B €d Southbound Thru 20 26 8.90 0.61 4.69 8.90 A	f 142 Road B / Ra All-wa HCM 7t Right 75 97	27 an 11 ahube Stree ay stop h Edition F Left 90 116 10 4	d Ert et Rahube Stre €astbound Thru 25 32 9,67 1.58 12.07 9,67 A	et <i>Right</i> 30 143	9 Left 2 2	Rahube Stree €/ Westbound ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑	et <i>Rig</i> 5 7

Intersection of Rahube Street and Main Street

2027	7 Weekda	ay AM wit	h Erf 1427	and Erf	1719	
Number			10	s		
Intersection			Main Street / I	Rahube Street		
Notes						
Control Type			Two-wa	iy stop		
Analysis Method			HCM 7th	Edition		
Name	Main	Street	Main S	Street	Rahube	Street
Show Name	۲.	í	12/	í	ជ	
Approach	North	oound	Southb	ound	Westbo	ound
Lane Configuration	ł	•	÷		т	•
Turning Movement	Thru	Right	Left	Thru	Left	Right
Base Volume Input [veh/h]	67	35	60	115	82	29
Total Analysis Volume [veh/h]	87	72	89	148	186	70
Movement, Approach, & Interse	ection Results		· · · · · · · · · · · · · · · · · · ·			
V/C, Movement V/C Ratio		0.05	/////0,00//////	/////0.00//////	0.22	0.13
d_M, Delay for Movement [s/veh]	0,00	7.78	0.00	0,00	11.75	14.00
d_Rank1, Delay to Rank 1 Vehicle [s/veh	0.00		0.00	0.00		
Movement LOS	A	А	A	A	В	В
Critical Movement						szí
95th-Percentile Queue Length [veh/In]	0.12	0.12	0.00	0.00	1.54	1.54
95th-Percentile Queue Length [m/In]	0.95	0.95	0.00	0.00	11.71	11.71
d_A, Approach Delay [s/veh]	3.	52	0.0	0	12.3	6
Approach LOS	4	4	A	N	В	
V/C_I, Worst Movement V/C Ratio			0.1	13		
d_I, Worst Movement Control Delay [s/ve			14.	00		
d_I, Intersection Delay [s/veh]			5.2	71		
Intersection LOS			E	3		

Number				16		
Intersection			Main Street	/Rahube Street		
Notes						
Control Type			Two-v	vay stop		
Analysis Method			HCM 7	th Edition		
Name	Main	Street	Main	Street	Rahube	e Street
Show Name	£	1í	1	۲ <u>۷</u>	£	6
Approach	North	bound	South	nbound	West	ound
Lane Configuration	1	-	•	1	1	-
Turning Movement	Thru	Right	Left	Thru	Left	Right
Base Volume Input [veh/h]	114	102	43	89	75	33
Movement, Approach, & Inters	ection Results	,				
V/C, Movement V/C Ratio		0.15		0.00	0.14	0.17
d_M, Delay for Movement [s/veh]	0,00	7.87	0.00	0,00	11.78	18.54
d_Rank1, Delay to Rank 1 Vehicle [s/veh	0.00	0,00	0.00	0.00		
Movement LOS	A	A	А	A	В	С
Critical Movement						₹ <u>/</u>
95th-Percentile Queue Length [veh/In]	0.39	0.39	0.00	0.00	1.33	1.33
95th-Percentile Queue Length [m/In]	2.95	2.95	0.00	0.00	10.13	10.13
d_A, Approach Delay [s/veh]	4.5	59	0.	00	13.	33
Approach LOS	4	A la	4	A	B	l)
V/C_I, Worst Movement V/C Ratio			0.	.17		
d_I, Worst Movement Control Delay [s/ve			18	3.54		
d_I, Intersection Delay [s/veh]			5.	.66		
Intersection LOS				С		