Traffic Engineering & Transport Planning
STURGEON CONSULTING

Traffic Impact Assessment

for the

PROPOSED FILLING STATION DEVELOPMENT ON PORTION 7 OF JACOBUSKRAAL FARM NO. 554, YZERFONTEIN, WESTERN CAPE

Project No: STUR0325

May 2022
Final Report

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TITLE:
TRAFFIC IMPACT ASSESSMENT FOR THE PROPOSED FILLING STATION DEVELOPMENT ON PORTION 7 OF JACOBUSKRAAL FARM NO. 554, YZERFONTEIN

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SYNOPSIS:
This report assesses the key transportation issues pertaining to the proposed Filling Station development on Portion 7 of Jacobuskraal Farm No. 554 in Yzerfontein.

SUMMARY SHEET

Report Type	Traffic Impact Assessment
Title	Filling Station Development on Portion 7 of Jacobuskraal Farm 554
Location	Yzerfontein, Western Cape
Client	JETVEST (Mr Werner Ackerman)
Reference Number	STUR0325
Project Team	Sarah Larratt Annebet Krige
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Date	May 2022
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

PGWC – Provincial Government Western Cape

WGC – Western Cape Government

RNIS – Road Network Information System

SDP – Site Development Plan

NMT – Non-Motorised Transport

LOS – Level of Service

PHF – Peak Hour Factor

AM – Morning

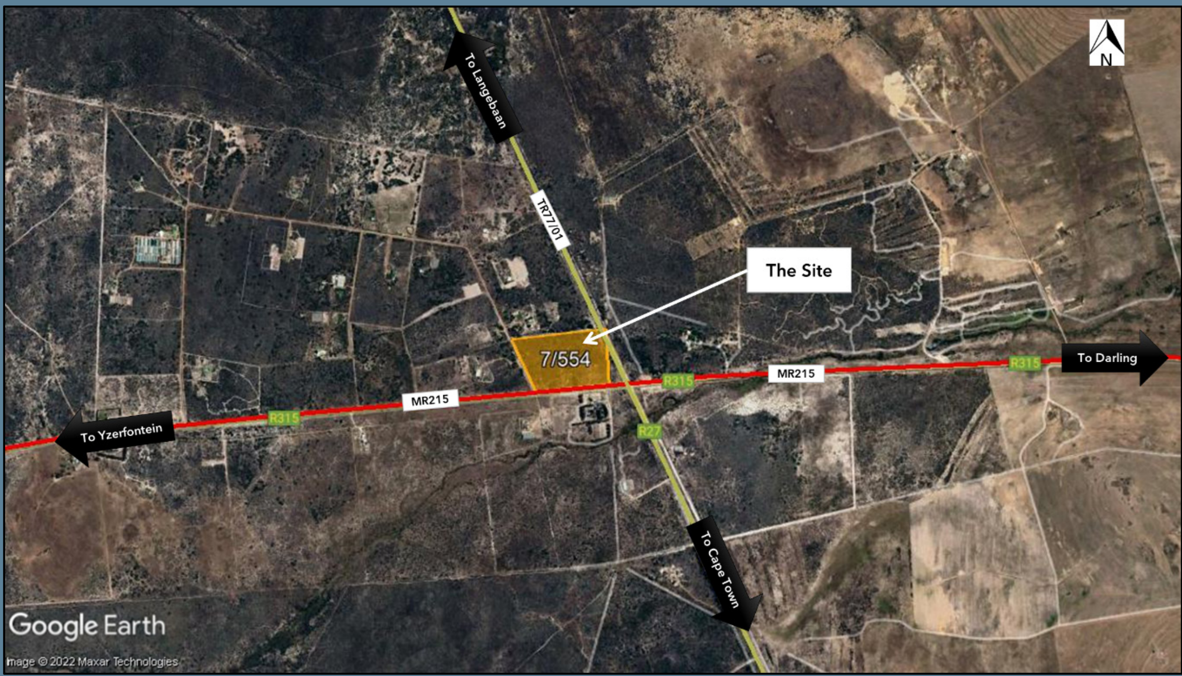
PM – Afternoon

d – Average delay in seconds

v/c – Volume/capacity ratio

vph – vehicles per hour

Traffic Impact Assessment (TIA) Proposed Filling Station Development on Portion 7 of Jocobuskraal Farm No. 554, Yzerfontein	
1. Purpose of Report	Sturgeon Consulting was appointed by **JETVEST Ltd** to determine the expected transport related impacts of the proposed filling station and associated retail and business components on the surrounding road network. This report is in support of the application for rezoning and consent use of Portion 7 of Farm Jacobuskraal No. 554, Malmesbury Division.
2. Locality *Reference: Figure 1*	Portion 7 of Jacobuskraal Farm No. 554, Yzerfontein, Western Cape. **Description:** The site is located to the east of the town of Yzerfontein. The portion that will be developed falls out of the urban edge of Yzerfontein and is bordered by the R315 (Main Road 215) to the south and the R27 (Trunk Road 77 Section 1) on the north-west corner of the R315 (MR215)/R27 (TR77/1) intersection. Refer to **Figure 1** in **Appendix A** for the Locality Plan. Currently Portion 7 of Farm 554 forms part of the Jacobskraal small holding, but not incorporated into the Jacobskraal Home Owners, which gains access at two locations along the R315 (MR215) as indicated below. It must be noted that the small holdings cannot repeat this type of development.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West Coast Farm Stall
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Yzervark Bistro & Bar
R27
R315
Beulah Farm Deli
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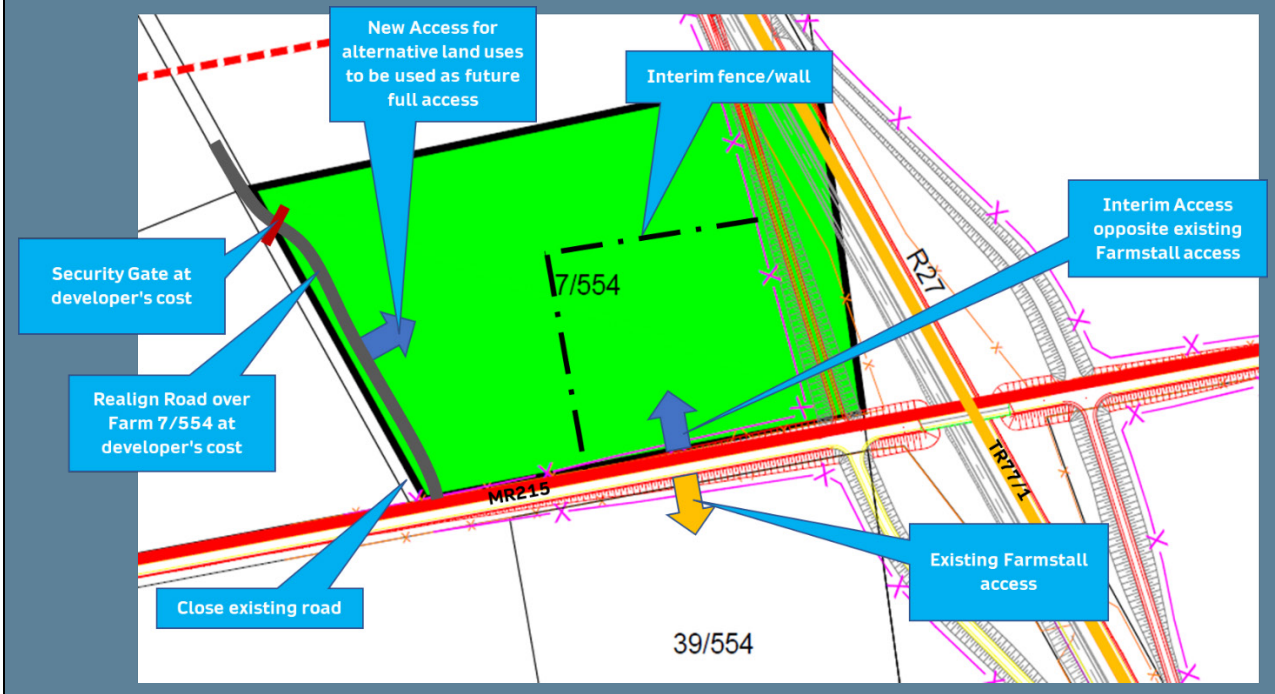
3. Scope of Work	The scope of work included in this TIA covers the following traffic engineering aspects: • Site observations; • Existing and proposed development; • Access arrangements; • Existing and future road network planning; • Existing traffic flows in the vicinity of the development; • Trip generation of the proposed development; • Traffic flow analysis; • Recommended road upgrades if necessary; • Non-motorised transport (NMT); • Public transport; and • Parking requirements.
4. Proposed Development *Reference: Figure 2*	The site is currently vacant, extent of 10.369ha. The proposed development comprises a filling station which includes a fuel station, shop, business premises and a tourist facility with a total development footprint of ±8.5ha. Refer to **Figure 2** for the proposed Site Development Plan.
5. Land Use / Zoning *Reference: Figure 2*	**Current Zoning / Use:** Agriculture Zone 3 **Proposed Zoning / Use:** Business Zone 3 (±42 300m^2): Filling station including wash bay, shop & business premises Agriculture Zone 3 (±6 070 m^2): Tourist facility Transport Zone 2 (±36 252m^2): Streets & parking **Figure 2** in **Appendix A** provides a copy of the proposed Site Development Plan (SDP).
6. Proposed Access	The first access point to the development is proposed off the R315 (MR215) approximately 190m west of the R27 (TR77/1)/R315 (MR215) intersection, opposite the existing farm stall access (Weskus Padstal). This access will serve only the filling station and convenience store. A fence between the filling station and the

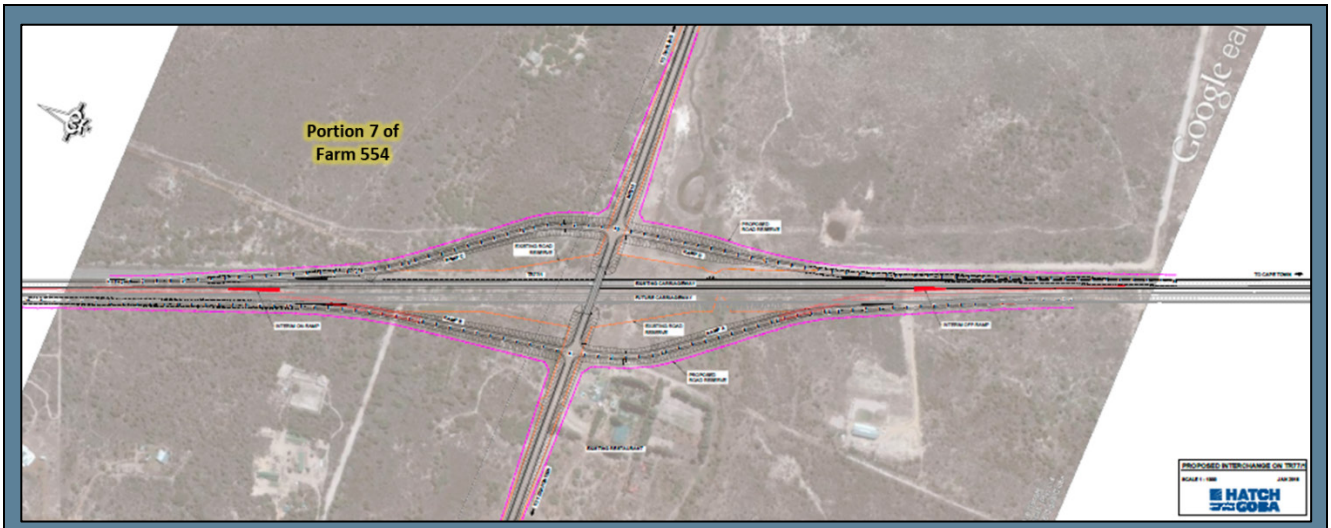
	remainder of the land uses will be implemented. The fence will then be removed once the Future R27 Interchange has been upgraded. The second access point will be located on the western side of the site approximately 100m north of the R315 (MR215) via a new re-aligned service road over the site. This proposed access will serve the remaining land uses on the site. The service road access will be approximately 240m west of the proposed interim filling station access. The reason for the realignment of the service road is to allow for the remainder of the Jacobskraal small holdings to still have the ability to have a controlled security access point as well as access to Portion 18 of Farm 554. The owner of Portion 18 can have access opposite the access to Portion 7 or to the north behind the security gate as indicated on the SDP. The existing servitude over Portion 18 will revert to the owner. The realigned access road and security gate will be for the cost of the developer of Portion 7. In the interim, both accesses will be operational. However, once the future interchange at the R27 is in place, only the access to the west will be allowed. The fence will then be removed. This will also require the existing access to the West Coast Farm Stall to be moved opposite the new service road intersection as part of the implementation of the new interchange.
	
7. Existing Roadways	**R27 (Trunk Route 77/1):** The R27 is a classified Class 1 expressway (R1c). It is a two-lane undivided road (one lane in each direction) with surfaced shoulders (2.4m each) and approximately 12.4m wide in

total. The posted speed limit in both directions is 120km/h but reduces to 100km/h at the R27/R315 intersection. The TR77/1 is a proclaimed provincial road which the Western Cape Government (WCG) is the Road Authority.

R315 (Main Road 215): The R315 is a Class 3 minor arterial (R3f). It is a two-lane undivided road (6.8m wide) with gravel shoulders and a posted speed limit of 100km/h. MR215 is a proclaimed provincial road which the Western Cape Government (WCG) is the Road Authority. It links to Yzerfontein to the west and Darling to the east. The road is in good condition.

8. Future Road Network

The long-term planning is for the implementation of a grade separated interchange at the R27 (TR77_01) / R315 (MR215) intersection. The proposed interchange layout prepared by Hatch Goba, January 2016 is shown below and in **Appendix C**.



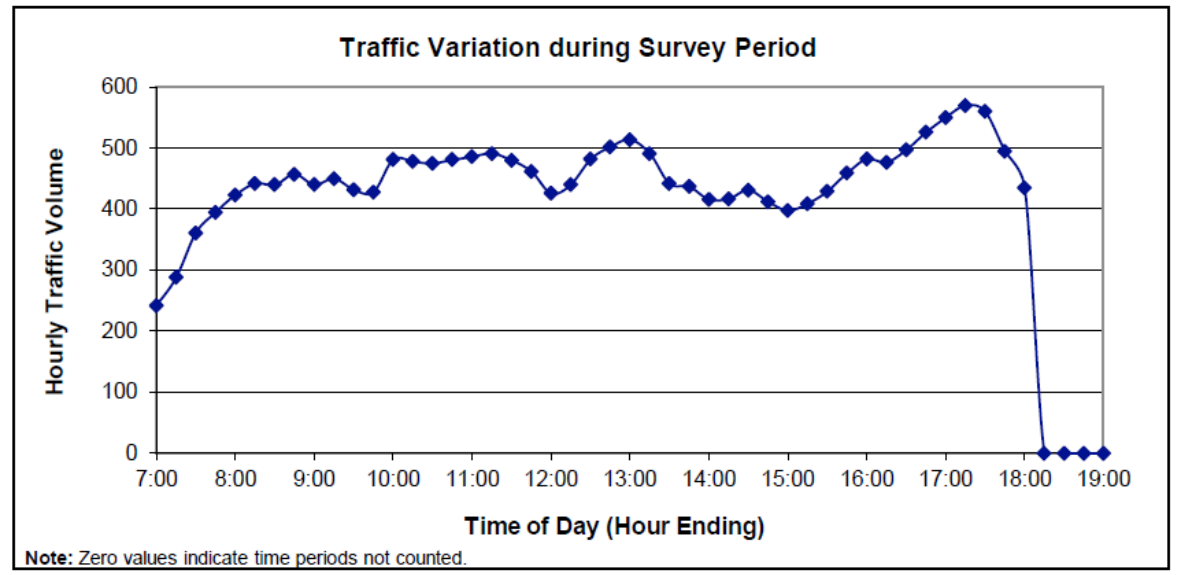
9. Analyses Hours	12-hour traffic counts were conducted at the R27/R315 intersection as well as the turning movements at the R315/Farm Stall access on Thursday 10 June 2021, 06:00 to 18:00. At the time of the traffic counts, South Africa was in Lockdown Level 1 and most economic activities have returned to normal, therefore these counts are deemed sufficient. The peak hours from these counts were: • Weekday AM peak hour: 09:00 to 10:00 • Weekday PM peak hour: 16:15 to 17:15 A growth rate of 3.5% per annum has been used to increase the 2021 volumes to 2022 volumes (see motivation for growth rate under Section 13).
10.Scenarios Analysed	• 2022 Present Traffic Demand • 2027 Background Traffic Demand (2021 traffic volumes escalated with a growth rate, as discussed in **Section 13** of this report) • 2027 Expected Traffic Demand plus the development trips Intersection analyses were done using SIDRA Intersection software (version 9).
11. Study Intersections	Based on our experience with similar traffic studies, the anticipated traffic impact on the surrounding road network and its location within the wider road network, the following intersections were included in the scope of the study: 1. R27 West Coast Road (TR77_01) / R315 Yzerfontein Road (MR215) – Two way stop controlled

	2. R315 Yzerfontein Road (MR315) / West Coast Farm Stall – Stop controlled 3. R315/New Servitude Road 4. Access 2/New Servitude Road

12. Existing Operations *References: Figure 3 & 4, Table 1*	The present traffic demand on the surrounding road network can generally be described as medium. Refer to **Figure 3** and **Figure 4** for a summary of the existing counted traffic volumes at each of the study intersections. The following comments are made in relation to the traffic volumes (total two-way) on the surrounding road network: • The total peak hour traffic volumes observed through the intersection was **481 vph** and **570 vph** during the AM and PM peak hours, respectively. • It is clear from the traffic counts that the R27 carries most of the traffic (±70%). • The R315 carries low volumes of traffic west of the R27, approximately **190 vph** (two-way) during the AM peak hour and approximately **220 vph** during the PM peak hour. • The AADT on the R27 is approximately **6 300 vpd** (two-way) and on the R315 approximately **3 300 vpd** (two-way). The Sidra results indicate that the study intersections are all currently operating at good levels of service (LOS) with minimal delays. No

upgrades are required in this scenario.

See **Table 1** for the existing capacity analysis. Full details of the SIDRA analysis can be provided if required.



13.Background Traffic

References: Figure 5 & 6, Table 1

The TMH 17: South African Trip Data Manual recommends the following growth rate factors for different development areas:

Table 1.1: Typical Traffic Growth Rates

Development Area	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%

Source: City Council of Pretoria (1998)

The estimated 2027 AM and PM peak hour background traffic volumes are indicated in **Figure 5** and **Figure 6**.

Being located in an average growth rate area, a **3.5% per annum** was used to determine the background 2027 traffic volumes and is deemed appropriate for this area taking into account the magnitude of on-going development in and around the area as well as the current economic climate. This can also be related to the growth rate indicated on the Western Cape Government Road Network Information System (RNIS).

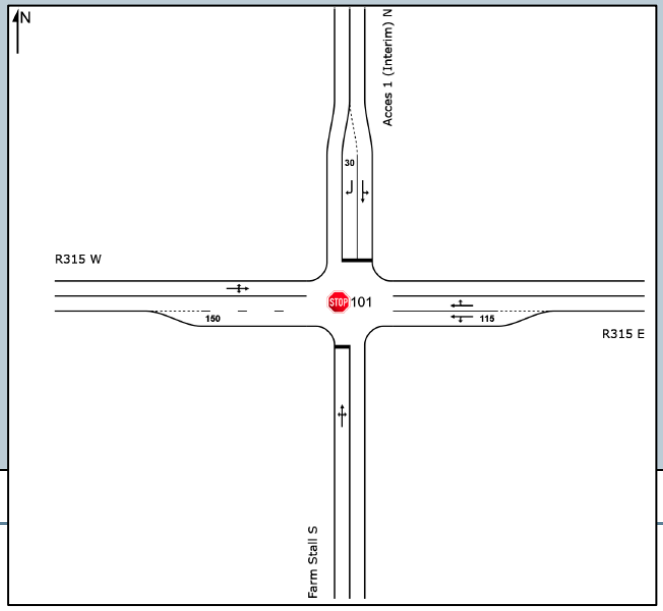
From the background analysis it is clear that the study intersections are expected to continue to operate at good levels of service (LOS) with minimal delays during the background (2027) conditions for both peak hours.

	Refer to **Table 1** for a summary of the SIDRA results. Full details of the SIDRA analysis can be provided if required.
14.Trip Generation Rates *References: Table 2*	The South African Trip Generation Manual (1995) recommends that a trip generation rate in terms of the percentage traffic attracted from the adjacent streets is 30% for light vehicle traffic and 40% for heavy vehicle traffic during the morning and afternoon peak hour for filling stations on the national and provincial freeways. It is assumed that traffic from the R27 and R315 will account for the adjacent street network. Therefore, the background traffic volumes along the R27 (from the south and north) and the R315 (from the west and east) will be used to derive the volume of traffic attracted to the filling station. This means that the filling station will attract approximately **163 vph** (two-way) from the R27 and **68 vph** (two-way) from R315 during the AM peak hour and **190 vph** (two-way) from the R27 and **83 vph** (two-way) from the R315 during the PM peak hour. The filling station will generate very few primary trips or attracted trips from the major roads. It has therefore been assumed that all the trips that will visit the filling station are already on the network and can be considered pass-by trips. No new or very few new trips will be generated by the filling station. The recommended peak hour trip generation for a **convenience shop/speciality retail** as provided in the *Trip Generation Manual, 9th Edition* published by the Institute of Transportation Engineers (ITE) is 0.68 trips per 100m^2 GLA (ITE826) with a directional split 48% inbound and 52% outbound in the AM peak hour and 2.71 trips per 100m^2 GLA (ITE826) with a directional split of 44% inbound and 56% outbound in the PM peak hour. The additional vehicle trips that will be generated by the proposed development is a combination of average trip generation rates as provided in the *TMH17 South African Trip Data Manual (Committee Draft 2.2, August 2020)* published by the Committee of Transport Officials (COTO). The 'Business' category could include retail, offices, industrial and services. The average trip rate for the 'Business' category used is 0.81 trips per 100m^2 GLA (60%:40%) in the AM peak hour and 1.05 trips per 100m^2 GLA (45%:55%) in the PM peak hour. The recommended peak hour trip generation rates for the proposed development are shown below:

	<table><tr><th rowspan="2">Land Use</th><th rowspan="2">Units</th><th rowspan="2">Extent</th><th rowspan="2">Peak Hour</th><th rowspan="2">TGR</th><th colspan="2">Split</th></tr><tr><th>In</th><th>Out</th></tr><tr><td rowspan="2">Speciality Retail[1] (ITE826)</td><td rowspan="2">100 GLA (m^2)</td><td rowspan="2">7195</td><td>AM</td><td>0.68</td><td>48%</td><td>52%</td></tr><tr><td>PM</td><td>2.71</td><td>44%</td><td>56%</td></tr><tr><td rowspan="2">Business[2]</td><td rowspan="2">100 GLA (m^2)</td><td rowspan="2">11 380</td><td>AM</td><td>0.81</td><td>60%</td><td>40%</td></tr><tr><td>PM</td><td>1.05</td><td>45%</td><td>55%</td></tr></table> 1: Trip Generation Manual, Institute of Transportation Engineers, 9th Edition 2: Average trip generation rate These trips have been included as additional trips over and above the filling station attracted trips as primary trips (nett trips) taking into account the pass-by and diverted trips as shown below in **Section 15**. The estimated additional peak hour trips are summarised in **Table 3**.
15.Development Trips *References: Figures 7 & 8, Table 3*	The total expected peak hour trips likely to be generated by the development during the AM and PM peak hours is: **Access 1 (Filling Station & Convenience Shop):** • 422 total AM trips (212 inbound 210 outbound) • 528 total PM trips (262 inbound 266 outbound) **Access 2:** • 125 total AM trips (72 inbound 53 outbound) • 249 total PM trips (111 inbound 139 outbound) **Total Trips** • **547 total AM trips (284 inbound 263 outbound)** • **778 total PM trips (373 inbound 405 outbound)** Refer to **Figures 7** and **8** for the development trips associated with the proposed development. The estimated additional peak hour trips are summarised in **Table 3**.
16.Trip Distribution	The generated traffic associated with the proposed development has been distributed onto the surrounding road network taking the following into account: • Present traffic conditions; • The nature of the development; and • Trip attractions within the area. Based on the above, the following distribution was used to assign the development traffic to the surrounding network for all peak hours: • 25% to/from the north along R27

	• 25% to/from the south along R27 • 10% to/from the east along R315 • 40% to/from the west along R315 The resulting development trips were added to the expected 2027 background traffic volumes. The resulting total traffic volumes are shown in **Figure 9** and **Figure 10.**

17.Approved Developments	There are no known developments in the area that will have a significant impact on the existing and future traffic operations at such time.
18. Impact of Development Traffic *References: Figures 9 & 10 and Table 1*	Very few new trips are expected to be generated by the filling station which will have an insignificant impact on the surrounding road network. The only new trips likely to be generated by the site will be from the retail and tourism component. As mentioned previously, it is assumed that all trips attracted to the filling station are already on the network (pass-by traffic). The expected 2027 traffic demand was calculated by adding the development trips to the background 2027 traffic demand. The capacity analyses indicated that the R27/R315 intersection, R315/Farm Stall/Access 1 (Interim) intersection and the R315/New Servitude Road intersection are all expected to operate at acceptable levels of service (LOS) with minimal delays. The critical side road approaches are operating at LOS A/B during the AM and PM peak hours. From a capacity analysis point of view,

	no upgrades are required. However, in terms of the *Western Cape Government – Access Management Guidelines 2020*, an additional westbound right turning lane is warranted at the R315/Farm Stall/Access 1 (Interim) intersection. Since this access is to be an interim access, it is proposed that an auxiliary lane (typical passing lane) is constructed rather than a full right turn lane since the approach speed will be 60km/h. Refer to Drawing No. WCS/11/5D1 published by the *Western Cape Government: Department of Transport and Public Works: Auxiliary Lanes – Geometric Layout, 2019*. Refer to **Appendix D**. The warrants for a right turn lane are discussed in **Section 20**. Once the proposed R27/R315 interchange is constructed, the interim access and the farm stall access will be closed, and a westbound right turn lane will be required at the R315/New Servitude Road intersection. Refer to **Appendix D** for the geometric layout as published by the Western Cape Government: Department of Transport and Public Works. Refer to **Table 1** for a summary of the SIDRA results. Full details of the SIDRA analysis can be provided if required.
19.Site Access	As mentioned in **Section 6**, two access points are proposed for the site. **<u>Access 1 (Interim):</u>** This access will be from the R315, approximately 190m west of the R27/R315 intersection. Access 1 will only serve the filling station and convenience shop. This access will be an interim/temporary access and will be closed once the future R27/R315 interchange comes online. However, the timeframes for this are not yet known. The proposed access will have a three-lane cross section i.e. one lane in and two lanes out. An auxiliary/passing lane is proposed. 

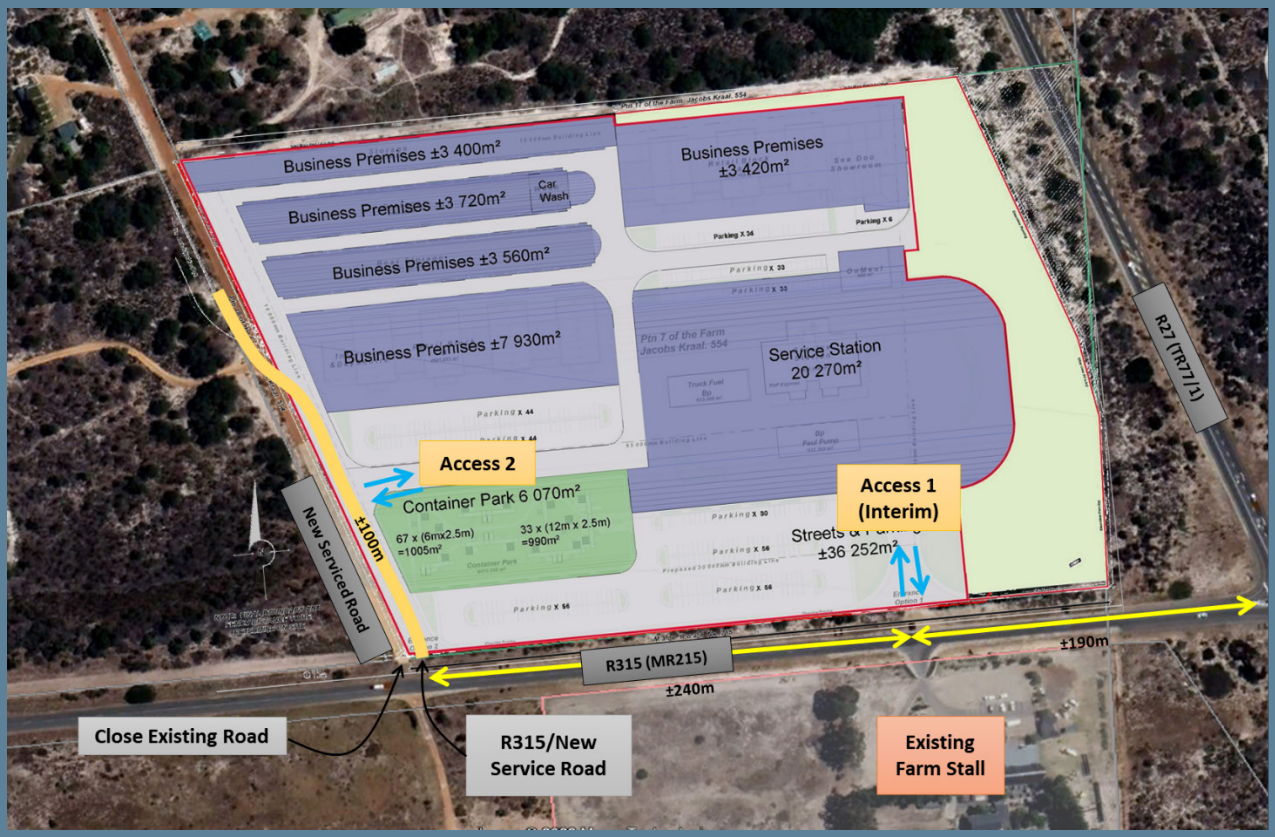
Access 2:

The new intersection on the R315 (MR215) will be approximately 240m west of the proposed filling station/farm stall intersection or 430m from the existing R315/R27 intersection. This intersection will require a right turn lane and will be warranted once the Interim Access has been closed as mentioned above in **Section 18**.

Access 2 will be located on the western side of the site approximately 100m north of the R315 (MR215) via a new re-aligned servitude road over Portion 7 at the developer's cost. This proposed access will serve the remaining land uses on the site. The proposed access will have a two-lane cross section (one lane in and one lane out).

The access intersections on the development access sides will be stop controlled.

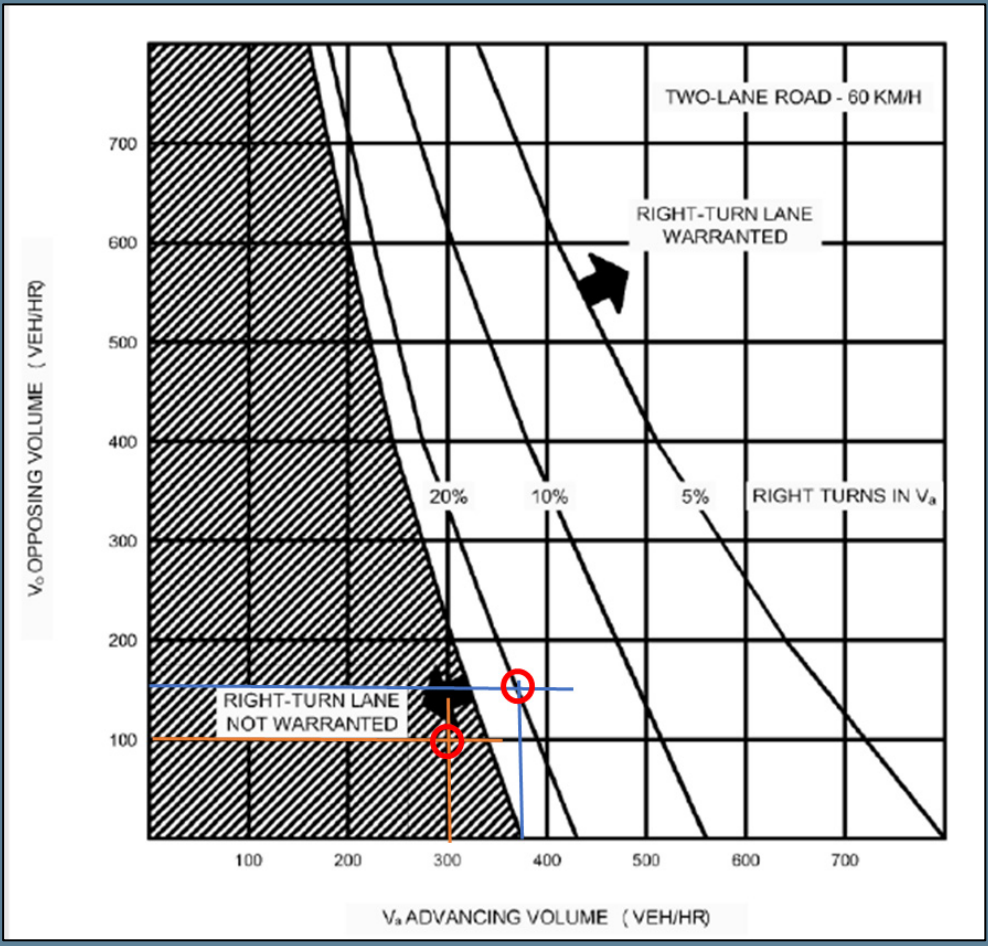
The capacity analysis of the accesses was discussed above in **Section 18**.



20. Right Turn Lane Assessment

The new *Western Cape Government – Access Management Guidelines 2020*, uses different graphs to determine the warrants for right turn lanes on two-lane roads. The right turn peak hour traffic volumes into Access 1 (Interim) on the R315 are **163 vph** (55%) and **201 vph** (53%) for the AM and PM peak hours, respectively. The R315/New Servitude Road intersection at this stage does not warrant a right turn lane. A right turn lane at this intersection will only be warranted once the Access 1 is closed.

Using the graph below with the opposing and advancing traffic volumes shown on **Figures 9 and 10**, a right turn lane is warranted.



21. Parking Requirements

The parking provision for the proposed development should satisfy the requirements as suggested in the *Swartland Municipality: Municipal Land Use Planning By-Law (25 March 2020)*. It is recommended that the parking requirement be addressed at detailed SDP Stage.

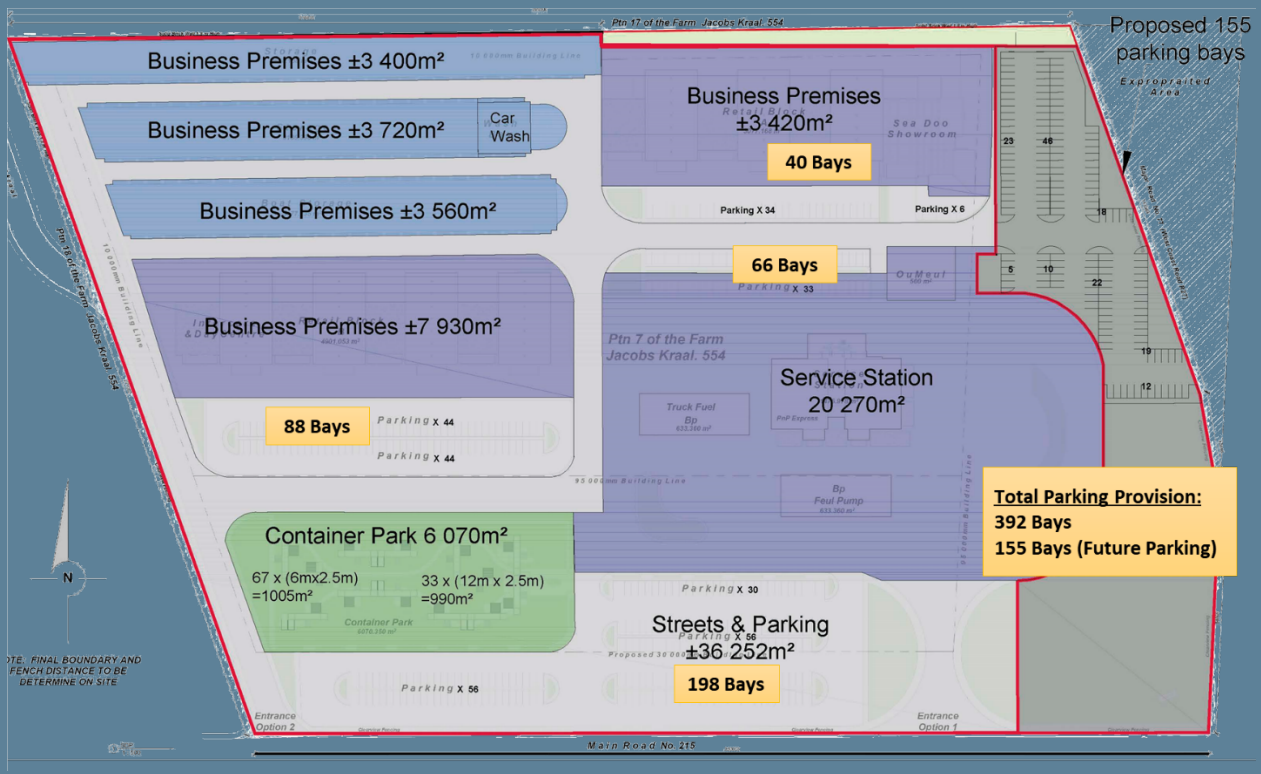
A summary of the standard parking requirements is as follow:

- Filling Station = 4 bays per repair area min of 8 bays plus 4 bays per 100m^2 GLA
- Single Shops = 1 bay per 25m^2 GLA

The parking layout will be addressed at the detailed development planning and detailed design stage. It may be possible to motivate for lower parking ratios under the shared parking premise.

An adequate number of parking bays must be provided at the site, to ensure both access and mobility within the development for other vehicles.

Approximately **392 parking bays** will be provided on site. If necessary, there is space for future parking (155 bays) in the event of future development.



22. Non-Motorised Transport (NMT) & Public Transport

There are no sidewalks along the R315, and pedestrians have to use the gravel shoulders. Pedestrian volumes in the vicinity of the site are deemed to be very low (<5 per hour), however there may be a portion of the staff/employees attracted to the proposed development that will access the site by non-motorised transport modes (i.e. on foot or by bicycle). It is anticipated that these will also be low. It is unlikely that the construction of sidewalks along the site frontages will be meaningful considering the absence of any meaningful connections to other pedestrian facilities.

	No NMT improvements are required. Currently, there are no public transport facilities along the R315 in the vicinity of the development. Very few minibus taxis and buses were observed during the AM and PM peak hours. The majority of minibus taxis and buses were observed along the R315: • AM peak hour: 1 minibus taxi • PM peak hour: 23 minibus taxis, 1 bus It is anticipated that the development will generate very few public transport passengers and if so, they will be dropped off and collected inside the site. No public transport improvements are required.
23. Conclusions	This report describes the investigation of transport implications of the proposed filling station development on Portion 7 of Jacobuskraal Farm No. 554, Yzerfontein. It summarises the existing transportation conditions within the site vicinity, provides an assessment of the transportation impacts of the proposed development on the surrounding road network, and recommendations with regard to improvements to mitigate negative impacts. The main findings and conclusions are: • This TIA is in support of the application for the proposed filling station and associated retail and business components development in Yzerfontein. • The proposed development will comprise of a filling station which includes a fuel station, shop, business premises and a tourist facility with a total development footprint of ±8.5ha. • The filling station provides a service to the travelling public and the trip generation for the filling station will depend primarily on the traffic volumes along the R27 and R315 (pass-by trips). • The filling station will have a limited impact on the road network and specifically on the operations at the R27 intersection. • Access to the filling station and convenience shop is proposed via Access 1 (Interim) only off the R315, approximately 190m west of the R27 intersection and opposite the existing West Coast Farm Stall access. A fence to be erected around the filling station area to stop other land use traffic using this access.

	• Access 2 to the remaining land uses is proposed on the west side of the site off a new re-aligned service road over the site, approximately 100m north of the R315/New Servitude Road intersection. • Access 1 (along with the opposite farm stall access) will be closed once the future R27/R315 Interchange comes online and Access 2 will be the main access to the site. A westbound right turn lane will be constructed on the R315/New Servitude Road intersection once this occurs. • The filling station will attract 30% of light vehicles and 40% of heavy vehicles from the R27 and the R315. • Based on the trip generation rates, the filling station and associated retail and business components can potentially generate **547 vph** trips (284 in, 263 out) during the AM peak hour and **778 vph** (373 in, 405 out) during the PM peak hour from the adjacent street network. • It is assumed that all trips attracted to the filling station are already on the network (pass-by traffic). • Very few new trips are expected to be generated by the proposed development which will have a low impact on the surrounding road network. • All intersections are currently operating at good levels of service during all peak hours with minimal delays. • A growth rate of **3.5% per annum** was used to grow the 2022 traffic volumes to estimate the 2027 background traffic volumes. • No geometric improvements are required to accommodate the growth in background traffic (2027). • After distribution of the development trips in 2027, the impact on the external road network will be low and the study intersections will continue to operate as good levels of service during both peak hours with minimal delays. • The site access at Access 1 (Interim) will have one lane in and two lanes out, with an auxiliary/passing lane along the R315 (MR215) widened on the southern side. Access 2 will have one lane in and one lane out. • The number of parking bays should be addressed at detailed SDP stage and should satisfy the relevant parking requirements contained in the *Swartland Municipality: Municipal Land Use Planning By-Law (25 March 2020)* parking schedule. **392 bays** have been provided.

	• No public- or non-motorised transport improvements are required.
24.Recommendations	From the report, the following are recommended that: • The Access 1 (Interim) access along the R315, opposite the existing farm stall approximately 190m west of the existing R27 intersection. • Access 1 (Interim) has one lane in and two lanes out with an auxiliary/passing lane widening the road to the south. • The new service road is re-aligned over Portion 7 of Farm 554 and the existing road is closed on R315. • The Access 2 is located approximately 100m north of the R315. • Once the future R27/R315 Interchange comes online, Access 1 (Interim) (including the existing farm stall access) will be closed. • A westbound right turn lane be constructed at the R315/New Servitude Road intersection once the Access 1 (Interim) is closed. • All the detailed design of the above-mentioned road infrastructure be approved by the relevant Road Authority before construction commences. This report has shown that the proposed development can be accommodated by the adjacent transport network, provided the recommendations presented in the report are implemented. From a traffic engineering perspective, the application for this development is supported.

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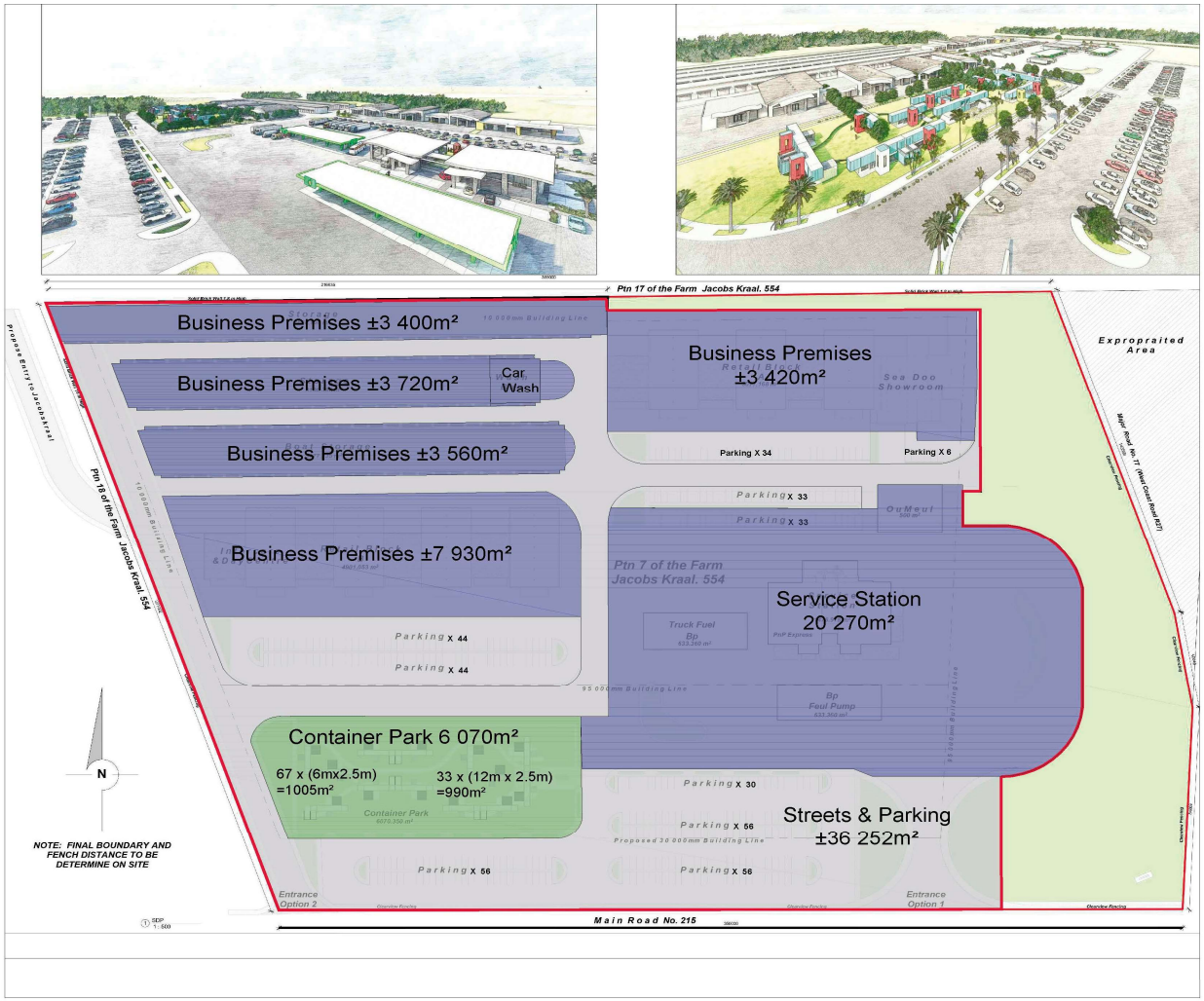
1. Provincial Administration: Western Cape, Department of Economic Affairs, Agriculture and Tourism: Transport Branch, Road Access Guidelines and Policies, Sept 2002.
2. Western Cape Government: Access Management Guidelines, Final, 2020.
3. Department of Transport, Guidelines for Traffic Impact Studies, 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, TMH 17, Committee Draft 2.2, August 2020.
6. Committee of Transport Officials (COTO), South African Traffic Impact and Site Traffic Assessment Manual, Volume 1 TMH 16, Committee Draft 2.0, May 2018.
7. Committee of Transport Officials (COTO), South African Traffic Impact and Site Traffic Assessment Manual Standards and Requirements Manual, Volume 2 TMH 16, Committee Draft 2.0, October 2020.
8. Institute of Transportation Engineers, Trip Generation Manual, 9th Edition.
9. Swartland Municipality: Municipal Land Use Planning By-Law, 2020.

APPENDIX A: FIGURES

Traffic Engineering & Transport Planning STURGEON CONSULTING	Project: PORTION 7 OF FARM JACOBUSKRAAL NO. 554, YZERFONTEIN	Job No: STUR0325
	LOCALITY PLAN	Figure: 1



LEGEND

Development Area

ZONING

Business Zone 3	
Agriculture Zone 3	
Transport Zone 2	

Total Coverage (Development Area)

Business Zone 3	±42 300m²
Agriculture Zone 3 consent	±6 070m²
Transport Zone 2	±36 252m²

TITLE:
PROPOSED ZONING
Portion 7 of Farm 554 Malmesbury

NOTE:
ALL AREAS AND DISTANCES ARE SUBJECT TO A SURVEY

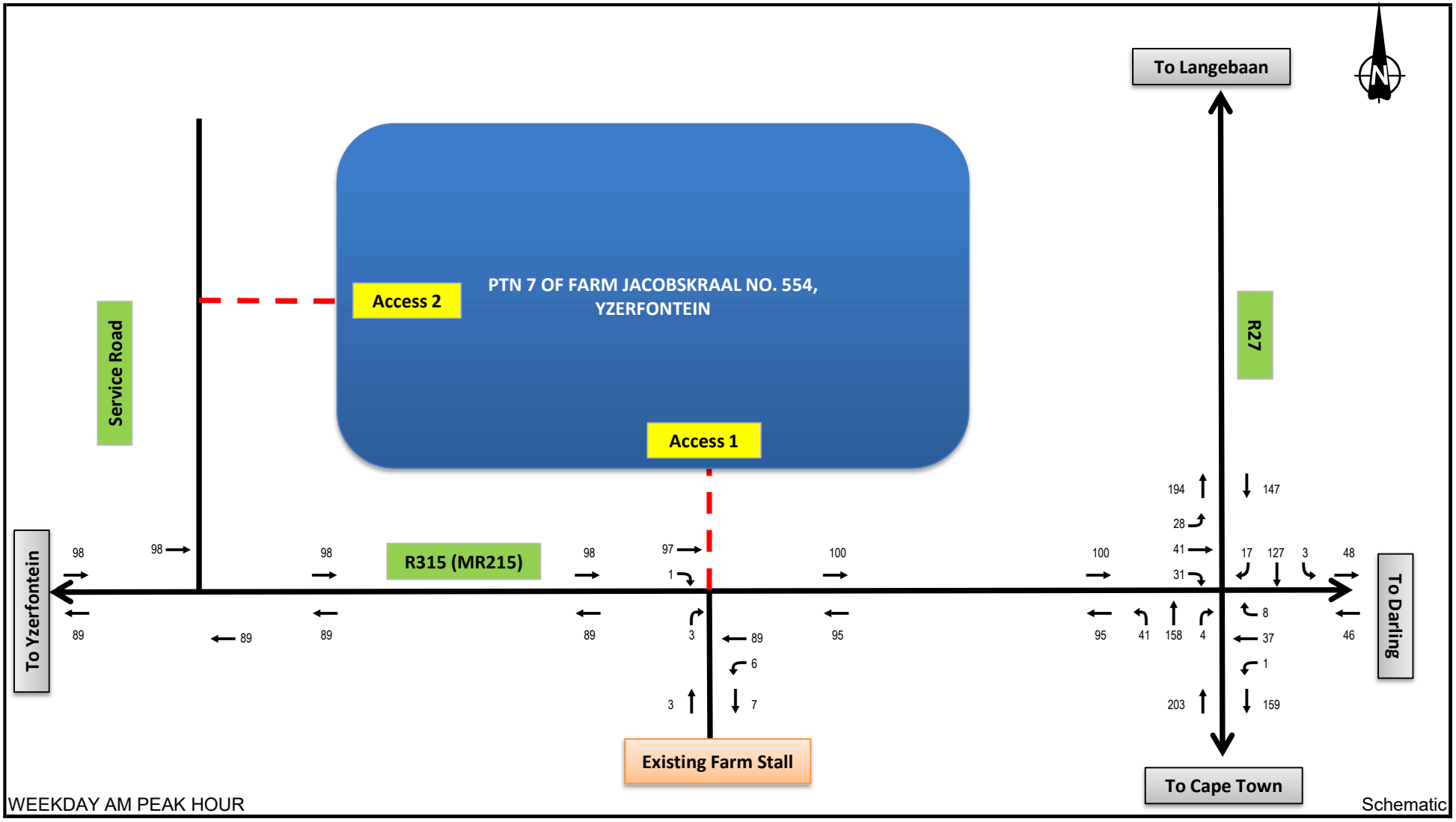
CREATED BY:

C.K. RUMBOLL & PARTNERS
TOWN PLANNERS
PROFFESIONAL SURVEYORS
16 RAINIER STREET, MALMESBURY
Tel: 022 – 4821845
Fax: 022 – 4871661
e-mail: anelia@rumboll.co.za

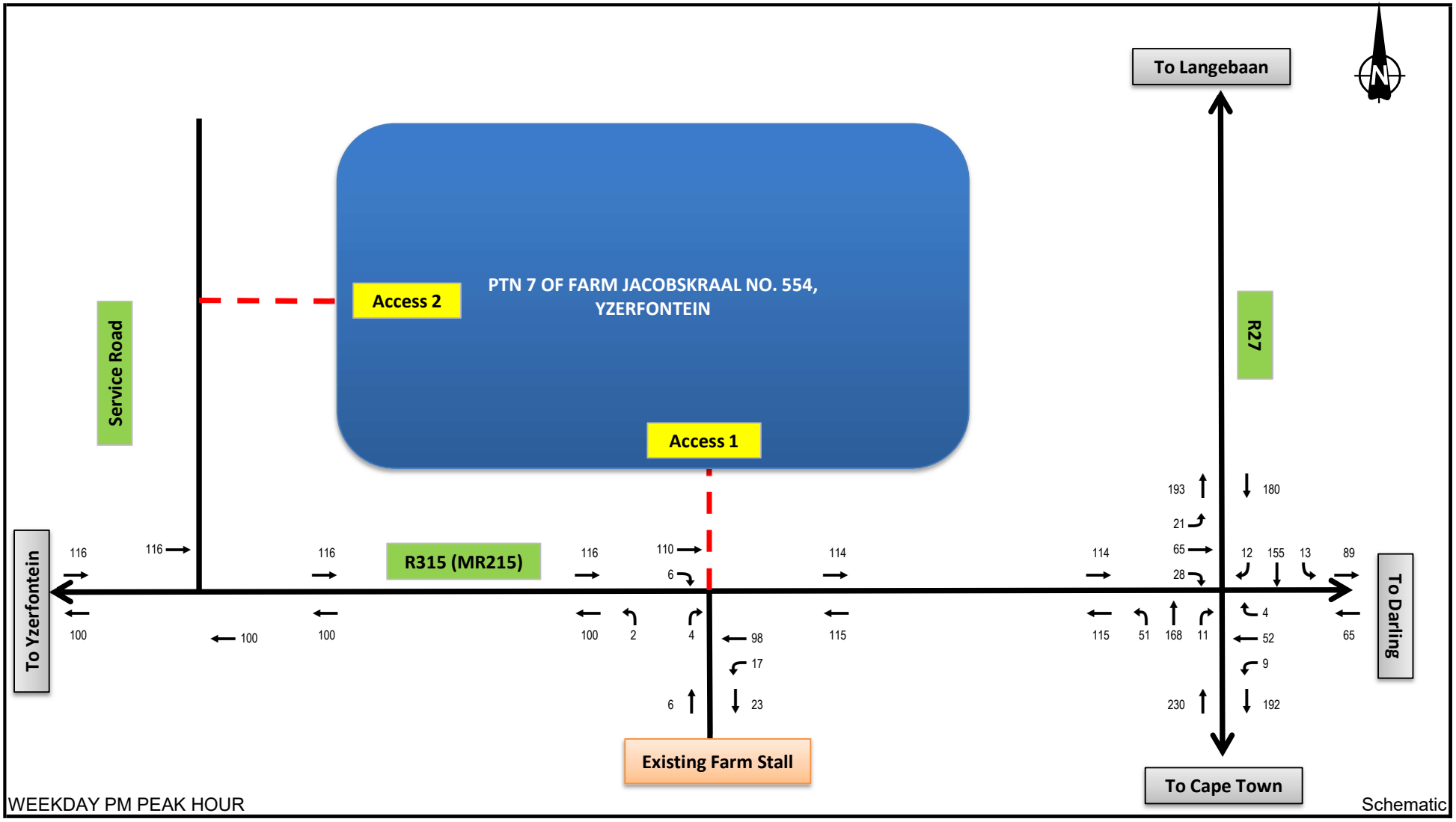
DATE:	AUTHORITY:
April 2022	SWARTLAND MUNICIPALITY
REF: YZE/11907/AC/IV	

Traffic Engineering & Transport Planning
STURGEON CONSULTING

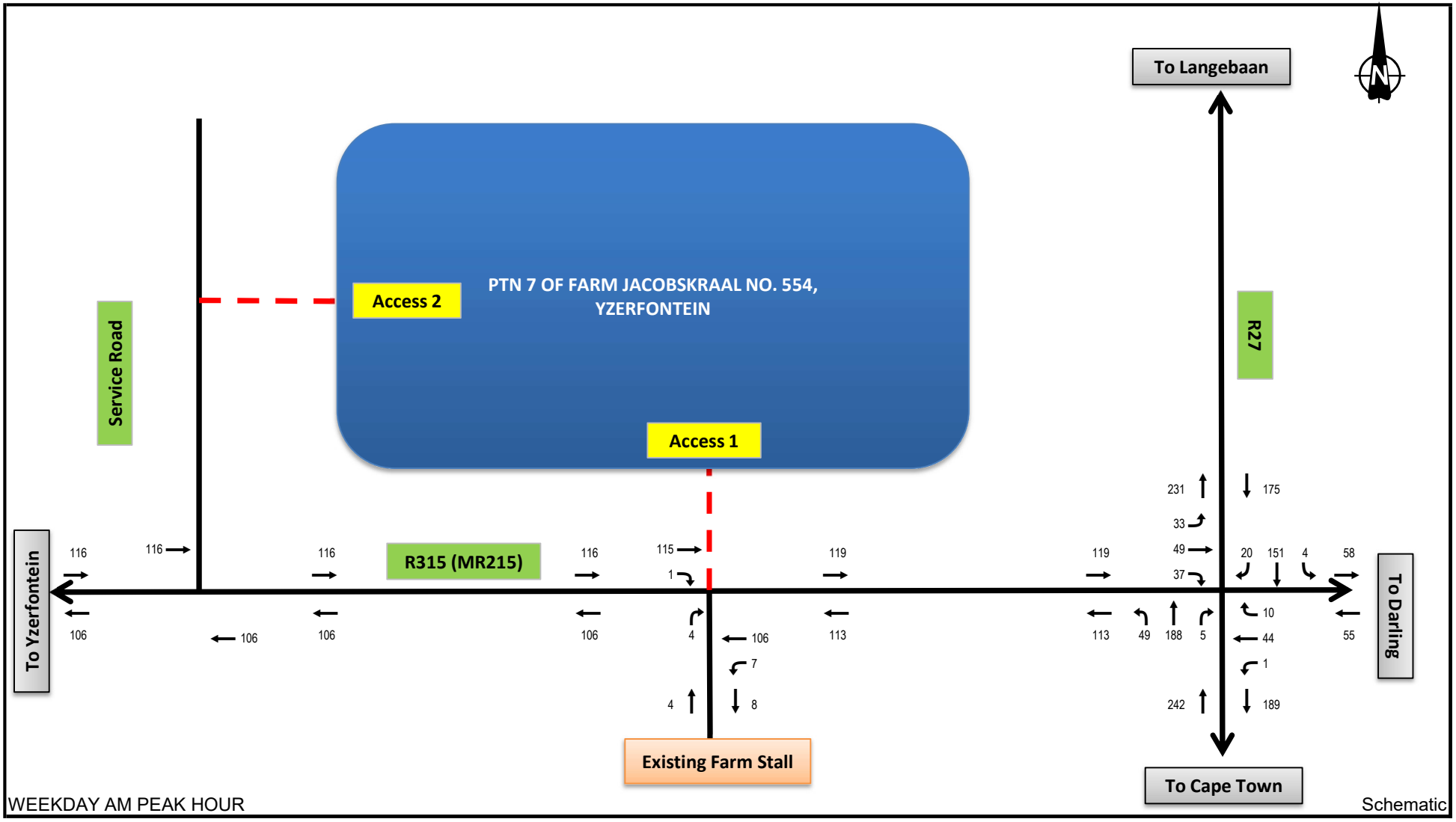
Project:	Job No:
PORTION 7 OF FARM JACOBUSKRAAL NO. 554, YZERFONTEIN	STUR0325
SITE DEVELOPMENT PLAN	Figure: 2



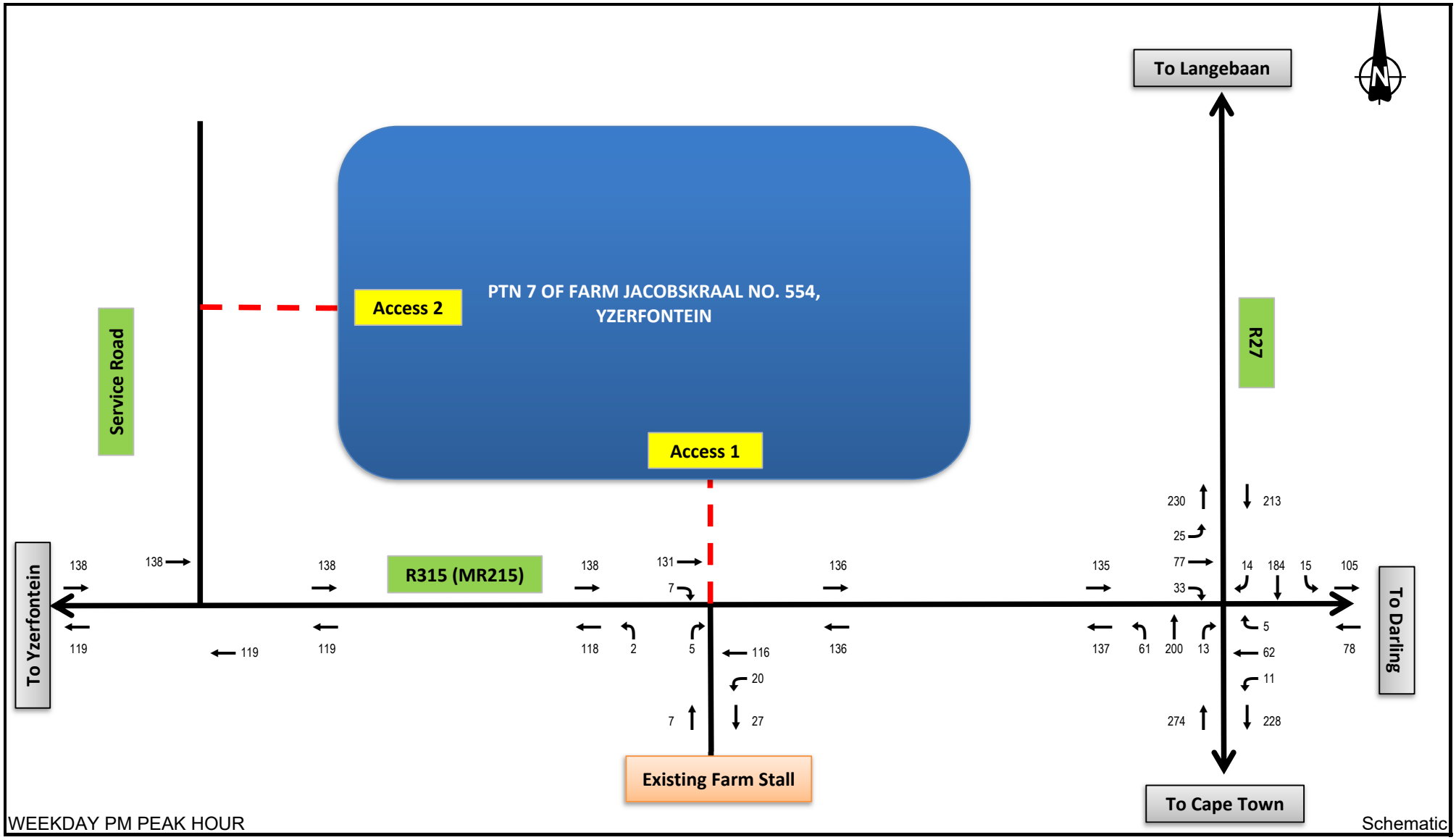
STURGEON CONSULTING	Portion 7 of Jacobuskraal Farm 554, Yzerfontein	Job Ref No: STUR0325
	Present Traffic Demand (2022)	Fig: **3**



STURGEON CONSULTING	Portion 7 of Jacobuskraal Farm 554, Yzerfontein	Job Ref No: STUR0325
	Present Traffic Demand (2022)	Fig: **4**



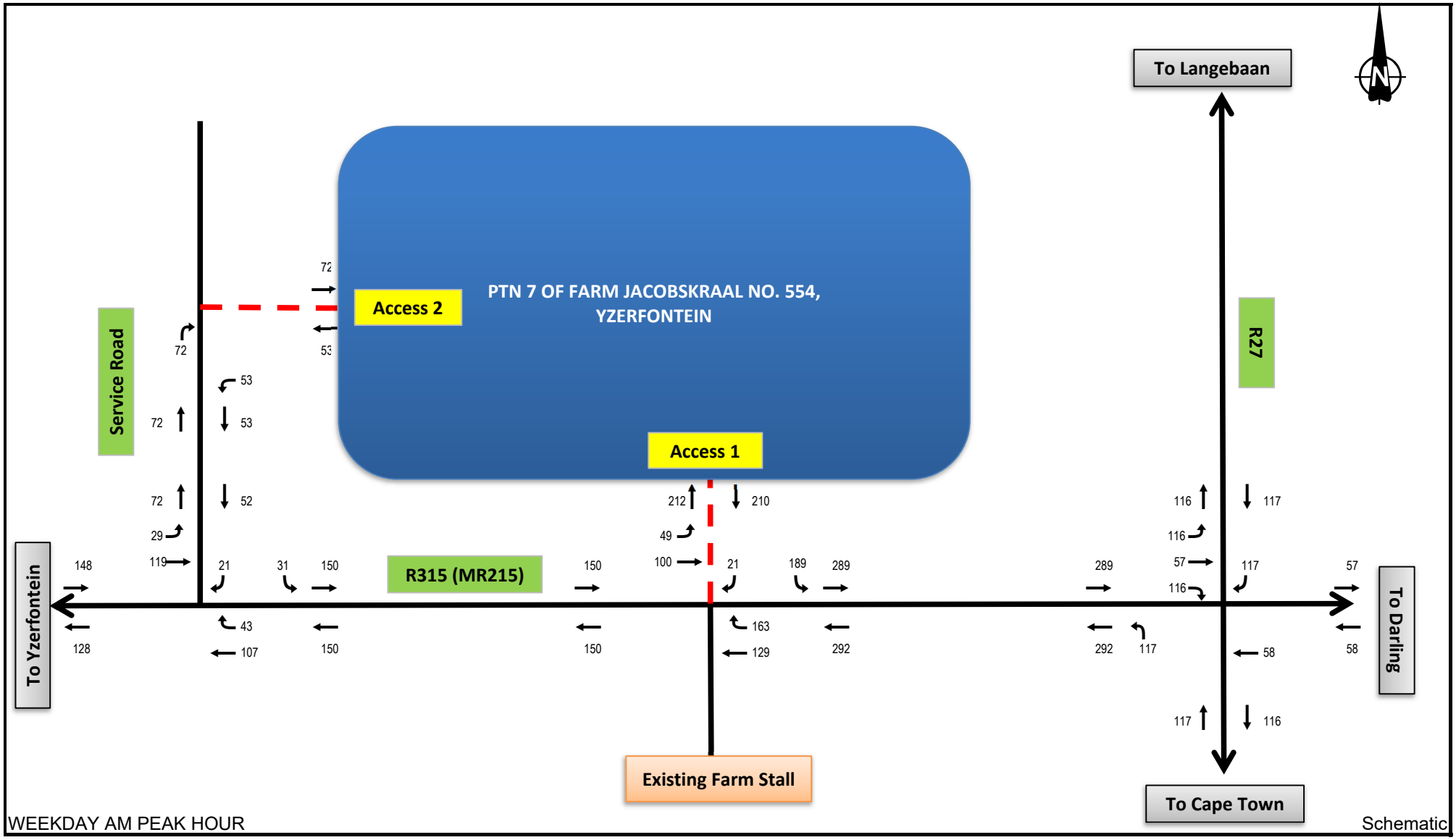
STURGEON CONSULTING	Portion 7 of Jacobuskraal Farm 554, Yzerfontein	Job Ref No: STUR0325
	Expected 2027 Traffic Demand	Fig: **5**



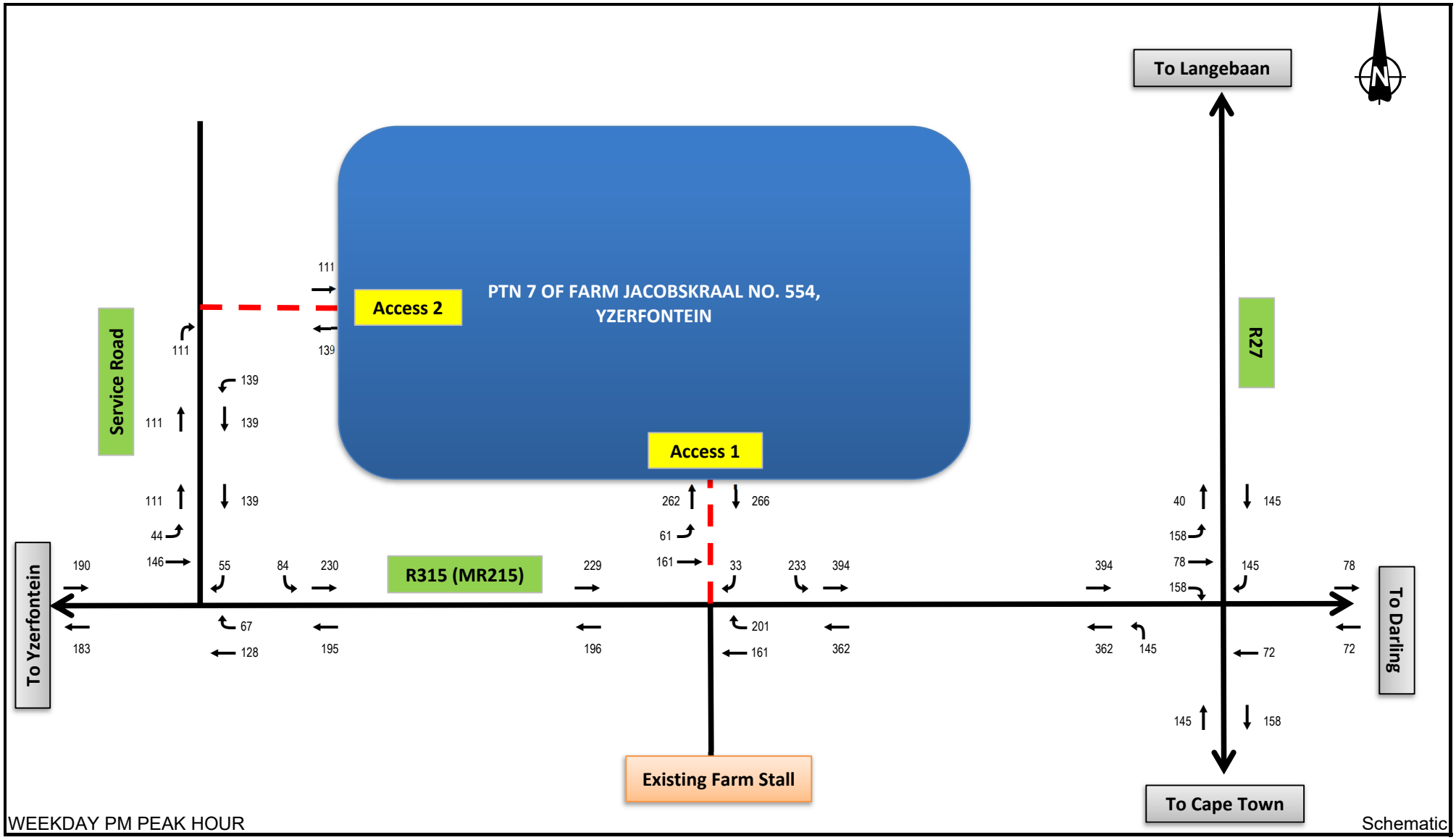
WEEKDAY PM PEAK HOUR

Schematic

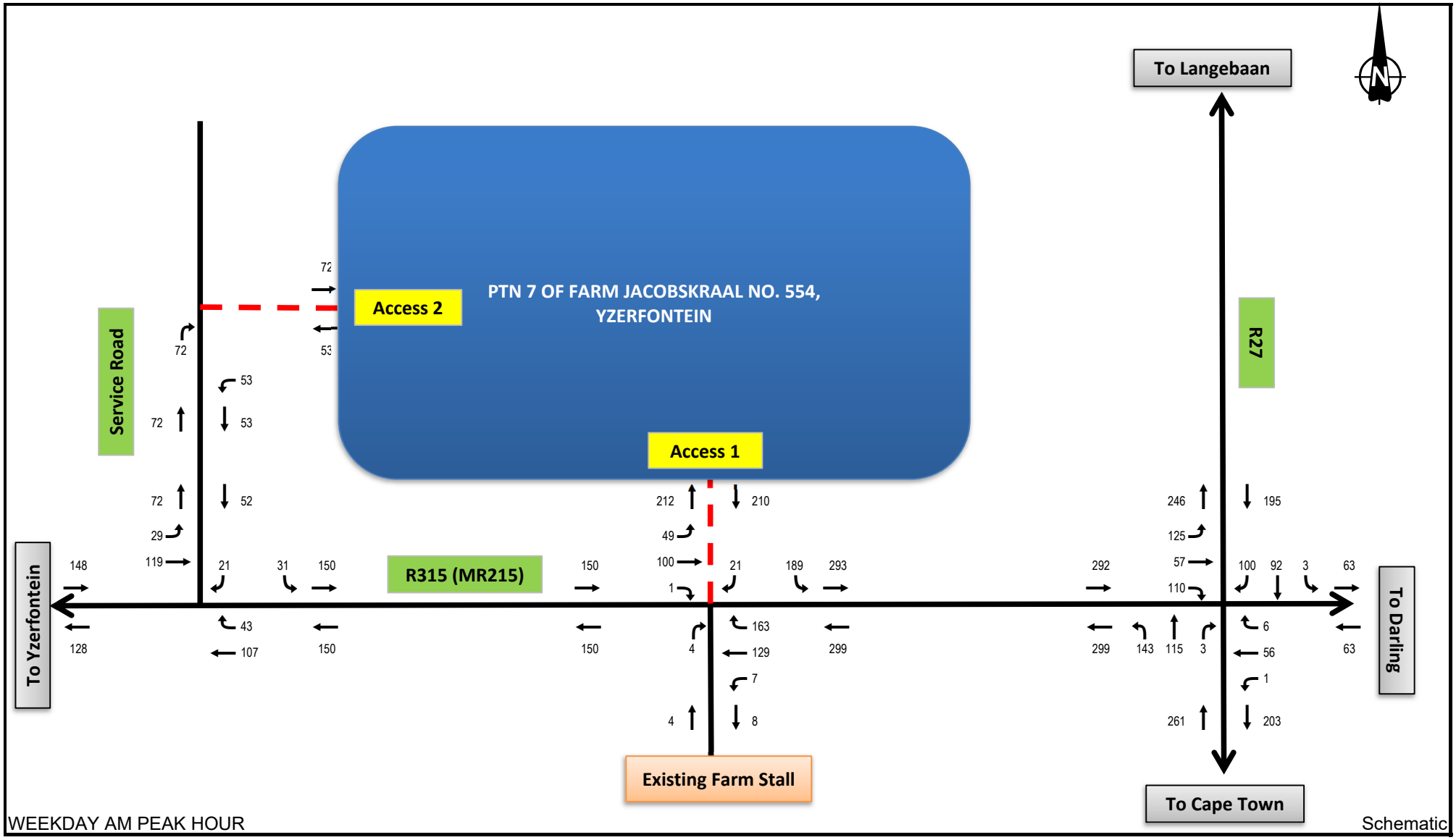
STURGEON CONSULTING	Portion 7 of Jacobuskraal Farm 554, Yzerfontein	Job Ref No: STUR0325
	Expected 2027 Traffic Demand	Fig: **6**



STURGEON CONSULTING	Portion 7 of Jacobuskraal Farm 554, Yzerfontein	Job Ref No: **STUR0325**
	Development Traffic	Fig: **7**



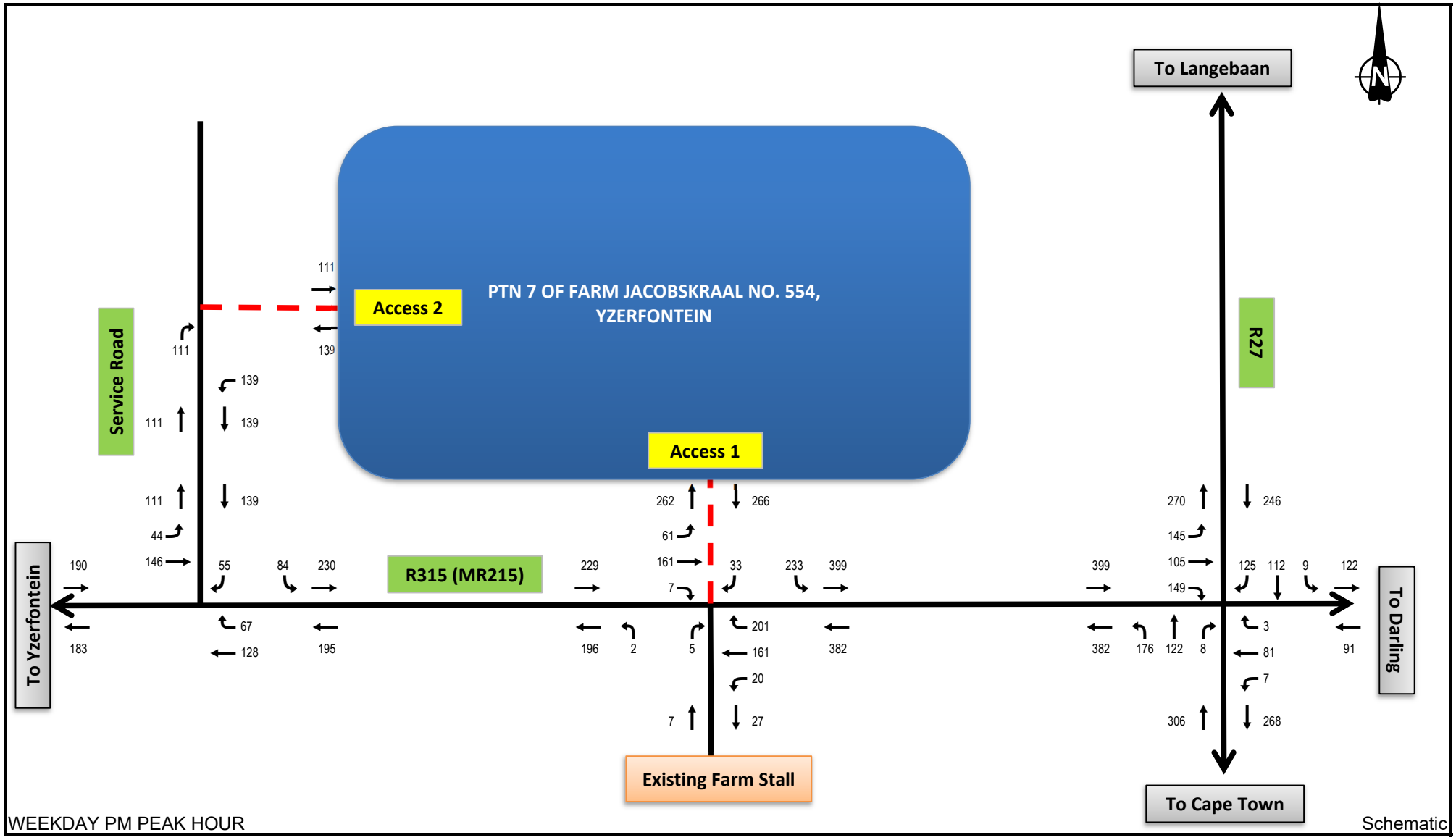
STURGEON CONSULTING	Portion 7 of Jacobuskraal Farm 554, Yzerfontein	Job Ref No: STUR0325
	Development Traffic	Fig: **8**



WEEKDAY AM PEAK HOUR

Schematic

STURGEON CONSULTING	Portion 7 of Jacobuskraal Farm 554, Yzerfontein	Job Ref No: STUR0325
	Expected 2027 Traffic Demand plus Development	Fig: 9



WEEKDAY PM PEAK HOUR

Schematic

STURGEON CONSULTING	Portion 7 of Jacobuskraal Farm 554, Yzerfontein	Job Ref No: STUR0325
	Expected 2027 Traffic Demand plus Development	Fig: **10**

APPENDIX B: TABLES

Table 1: Peak Hour Traffic Conditions at Intersections

Intersection	Scenario	Intersection Control	Peak Hour	Intersection Avg Delay (s)	Intersection LOS	Intersection v/c	Critical Approach			
							Approach	Avg Delay (s)	LOS	v/c
R27 (TR77/1) / R315 (MR215)	Existing (2022)	Stop Controlled	AM	3.9	N/A	0.121	East	11.0	B	0.061
	Background (2027)	Stop Controlled		4.1	N/A	0.153	East	11.9	B	0.082
	Expected 2027 + Development	Stop Controlled		6.9	N/A	0.351	East	12.3	B	0.098
	Existing (2022)	Stop Controlled	PM	4.2	N/A	0.147	West	10.9	B	0.147
	Background (2027)	Stop Controlled		4.4	N/A	0.194	West	11.8	B	0.194
	Expected 2027 + Development	Stop Controlled		8.5	N/A	0.533	West	14.5	B	0.533
R315 (MR215) / Farm Stall / Access 1	Existing (2022)[1]	Stop Controlled	AM	0.4	N/A	0.054	South	7.9	A	0.003
	Background (2027)[1]	Stop Controlled		0.4	N/A	0.064	South	8.0	A	0.003
	Expected 2027 + Development	Stop Controlled		4.8	N/A	0.112	South	10.9	B	0.009

Intersection	Scenario	Intersection Control	Peak Hour	Intersection Avg Delay (s)	Intersection LOS	Intersection v/c	Critical Approach			
							Approach	Avg Delay (s)	LOS	v/c
	Existing (2022)[1]	Stop Controlled	PM	0.8	N/A	0.066	South	8.0	A	0.004
	Background (2027)[1]	Stop Controlled		0.8	N/A	0.078	South	8.1	A	0.005
	Expected 2027 + Development	Stop Controlled		5.1	N/A	0.206	South	12.2	B	0.014
R315 (MR215) / New Service Road	Existing (2022)	Stop Controlled	AM	-	-	-	-	-	-	-
	Background (2027)	Stop Controlled		-	-	-	-	-	-	-
	Expected 2027 + Development	Stop Controlled		2.5	N/A	0.090	North	8.4	A	0.034
	Existing (2022)	Stop Controlled	PM	-	-	-	-	-	-	-
	Background (2027)	Stop Controlled		-	-	-	-	-	-	-
	Expected 2027 + Development	Stop Controlled		3.7	N/A	0.122	North	8.7	A	0.095

LOS – Level of Service, Delay in seconds per vehicle, V/C – Volume to Capacity Ratio
Notes 1: Farm Stall access only

Table 2: Proposed Trip Generation Rates

Land Use	Units	Rate	Directional Split
Filling Station	Adjacent Traffic	30% LGT 40% HV 16% New Trips	50 : 50
Speciality Retail	100m² GLA	0.68/100m² GLA (AM) 2.71/100m² GLA (PM)	48 : 52 44 : 56
Business[1]	100m² GLA	0.81/100m² GLA (AM) 1.05/100m² GLA (PM)	60 : 40 45 : 55

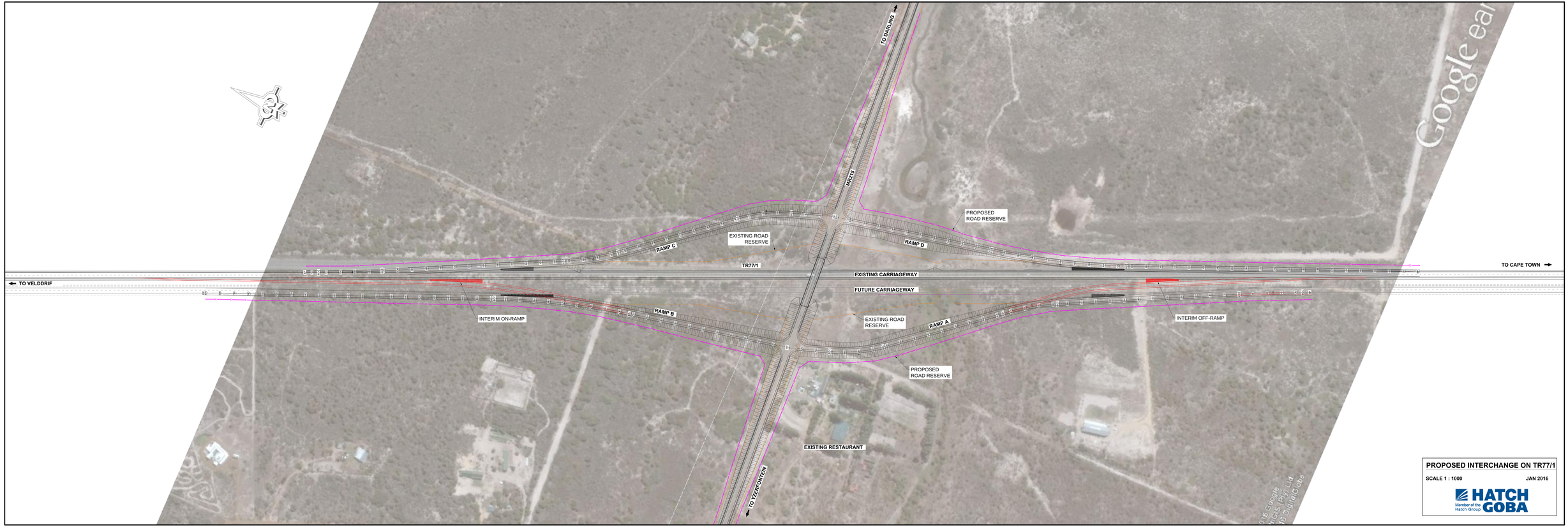
1. Average trip generation rate

Table 3: Estimated Peak Hour Trips

Peak Hour	Extent	Primary Trips (vph)	
		AM Peak Hour	PM Peak Hour
Filling Station[1]	1 Station	412	486
Speciality Retail	7 195m² GLA	43	170
Business	11 380 m² GLA	92	120
Total		**547**	**778**

Notes 1: Includes Pass-by and diverted trips, attracted trips for the filling station

APPENDIX C: PROPOSED R27 INTERCHANGE LAYOUT

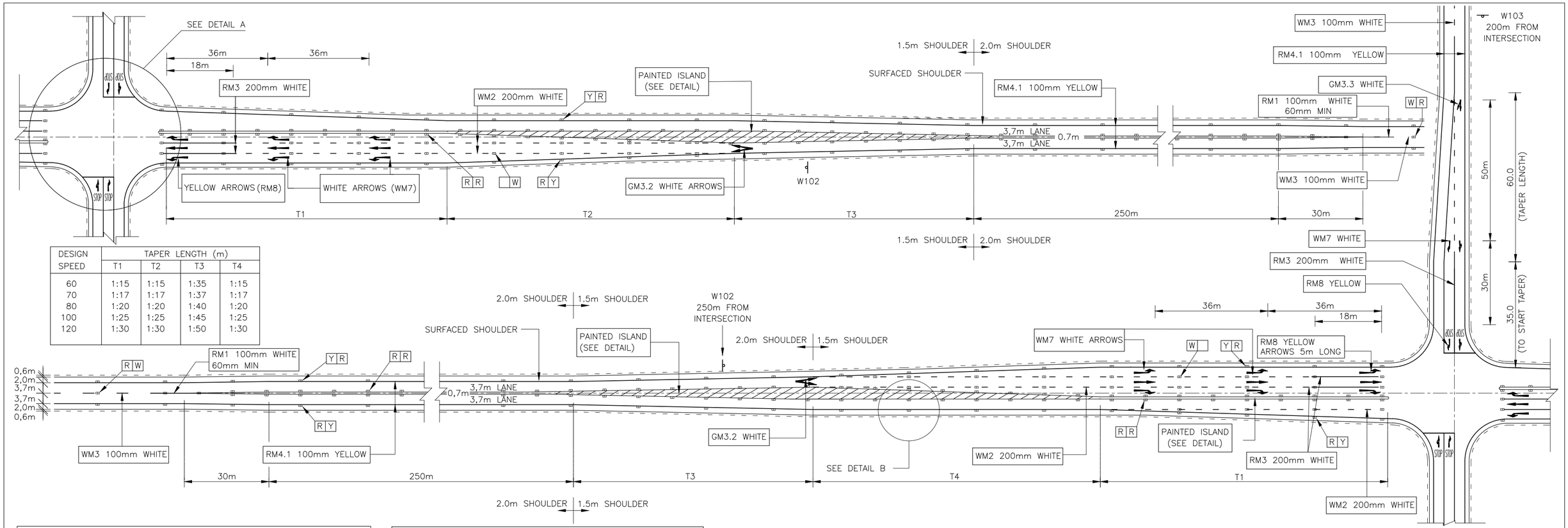


PROPOSED INTERCHANGE ON TR77/1

SCALE 1 : 1000 **JAN 2016**

HATCH GOBA
Member of the Hatch Group

APPENDIX D: WESTERN CAPE GOVERNMENT STANDARD PLANS

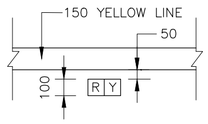


DESIGN SPEED	TAPER LENGTH (m)			
	T1	T2	T3	T4
60	1:15	1:15	1:35	1:15
70	1:17	1:17	1:37	1:17
80	1:20	1:20	1:40	1:20
100	1:25	1:25	1:45	1:25
120	1:30	1:30	1:50	1:30

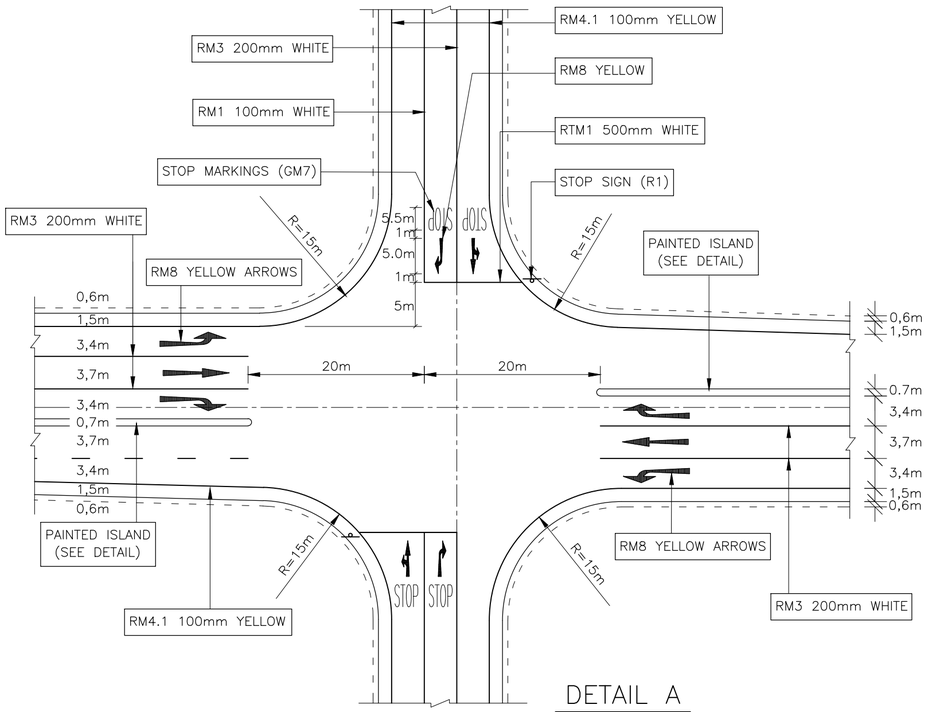
NOTES :

1. ALL ROAD SIGNS AND ROAD MARKINGS TO BE IN ACCORDANCE WITH SADC–RTSM LATEST EDITION.
2. FINAL POSITION OF ALL ROAD SIGNS TO BE CONFIRMEND BY THE ENGINEER ON SITE.
3. ROAD SIGNS TO BE PLACED AT LEAST 600mm FROM EDGE OF KERB OR 1,5m FROM SHOULDER.
4. REFER TO STANDARD DETAIL DRAWING WCS/56/C1–C9 FOR PERMANENT ROADSIGNS.
5. ROADSTUDS IN CARRIAGEWAY TO BE SPACED AT 24m CENTRES AND IN PAINTED ISLANDS AT 12m CENTRES.
6. STACKING LENGTHS TO BE CONFIRMED BY ENGINEER AFTER TRAFFIC ANALYSIS.
7. ROAD MARKING DIRECTION ARROWS
   – WM7 AND RM8= 5m LONG
   – GM3 = 7.5m LONG

ROAD SIGNS

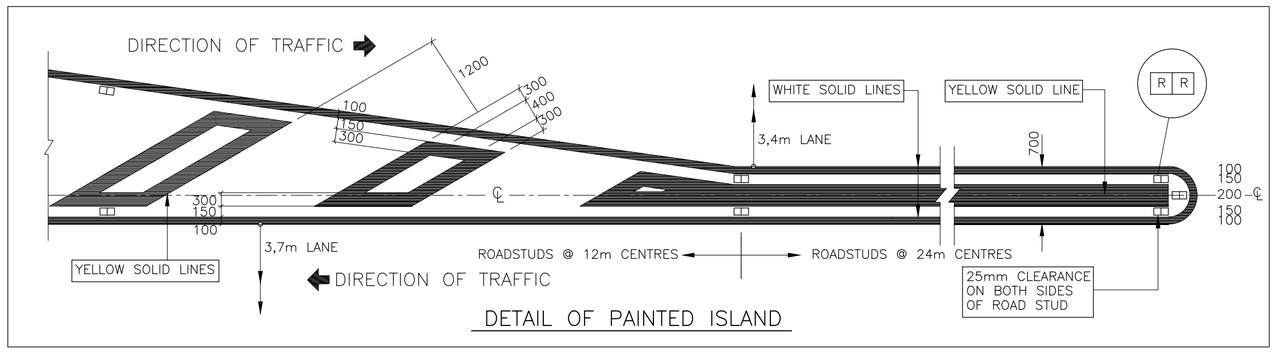


DETAIL B



DETAIL A

FOR SU+T (23m RADIUS)



DETAIL OF PAINTED ISLAND

No.	DATE	ADDITIONS AND AMENDMENTS	APPROVED	DATE

Issue Date: 2019

STANDARD PLANS

WESTERN CAPE GOVERNMENT
DEPARTMENT OF TRANSPORT AND PUBLIC WORKS

L.G.FOURIE
CHIEF DIRECTOR
ROAD NETWORK MANAGEMENT

INTERSECTIONS

X–INTERSECTIONS – SINGLE CARRIAGEWAY

SCALE : N.T.S.

A2 ORIGINAL

INDEX NO. WCS/11/2/D4

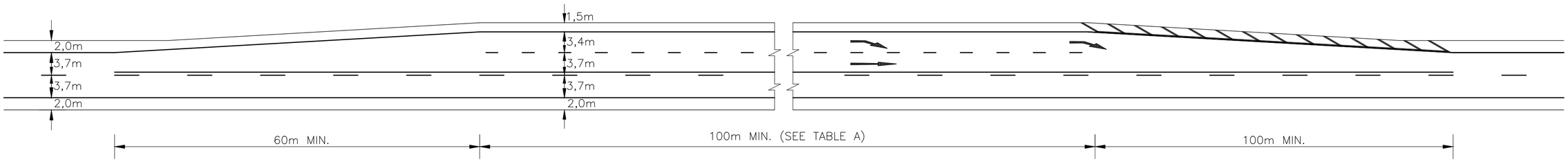
PLAN NO. SHEET 4 OF 4

TABLE A						
GRADE %	MIN. LENGTH OF EMBAYED CLIMBING LANE					
	PERCENTAGE TRUCKS					
	5	10	15	20	25	30
3	600	350	250	200	160	160
4	470	260	180	150	130	110
5	360	200	150	120	100	100
6	310	170	130	100		
7	270	150	110			
8	240	130	100			
9	210	120				
10	190	110				
11	180	100				
12	170	100				

NOTES :

1. LANE WIDTH MAY BE REDUCED ON THROUGH LANE TO 3,4m PER LANE AFTER CONSULTATION WITH P.R.E.
2. APPLICABLE FOR LOWER SPEED RURAL ROADS AND WHERE AUXILIARY LANES ARE WARRANTED

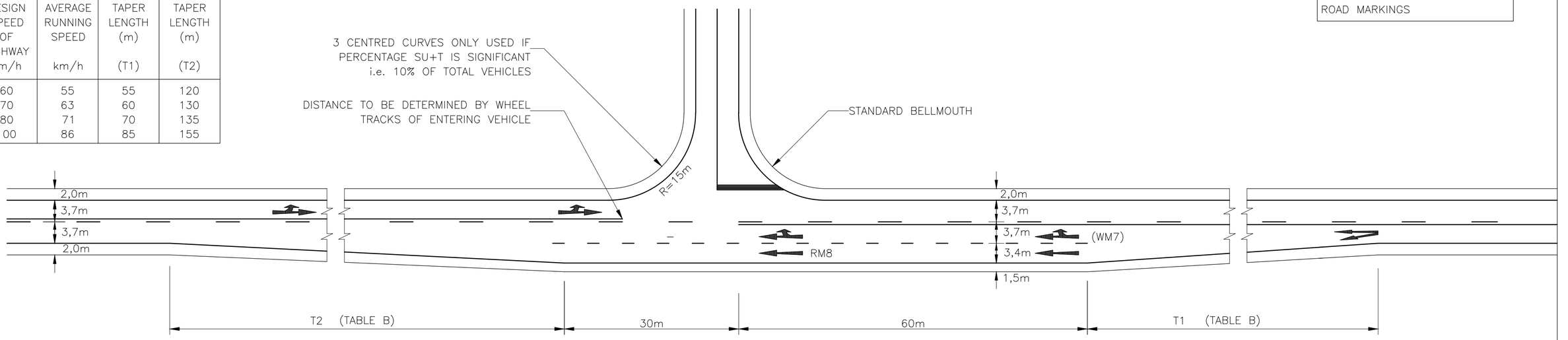
REFER TO DWG No WCS/57/1/D1 FOR DETAILS OF ROADSIGNS AND ROAD MARKINGS



TYPICAL CLIMBING LANE

TABLE B			
DESIGN SPEED OF HIGHWAY km/h	AVERAGE RUNNING SPEED km/h	TAPER LENGTH (m) (T1)	TAPER LENGTH (m) (T2)
60	55	55	120
70	63	60	130
80	71	70	135
100	86	85	155

REFER TO DWG No WCS/57/1/D1 FOR DETAILS OF ROADSIGNS AND ROAD MARKINGS



TYPICAL PASSING LANE

NOTE :

APPLICABLE FOR LOWER SPEED RURAL ROADS AND WHERE AUXILIARY LANES ARE WARRANTED

No.	DATE	ADDITIONS AND AMENDMENTS	APPROVED	DATE

Issue Date: 2019

STANDARD PLANS

WESTERN CAPE GOVERNMENT
DEPARTMENT OF TRANSPORT AND PUBLIC WORKS

L.G.FOURIE
CHIEF DIRECTOR
ROAD NETWORK MANAGEMENT

AUXILIARY LANES

GEOMETRIC LAYOUT

SCALE : N.T.S.

A2 ORIGINAL

INDEX NO. WCS/11/5/D1

PLAN NO. SHEET 1 OF 1