

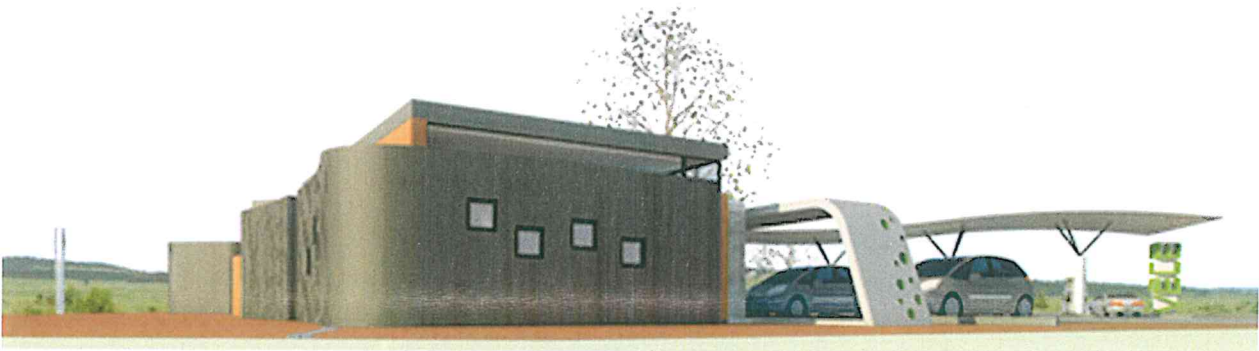


VLAKFONTEIN FILLING STATION & TRUCK STOP

TRAFFIC IMPACT ASSESSMENT

Date: March 2018

Ref. JT 0026



Project Name:	Vlakfontein Filling Station & Truck Stop
Project Number:	JT 0026
Report for:	CRC Developers

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1. INTRODUCTION

1.1 BACKGROUND

SMEC South Africa (Pty) Ltd is appointed by CRC Developers to undertake a Traffic Impact Assessment for the proposed Vlakfontein Filling Station and Truck Stop development in the Bronkhorstspuit area. The proposed development will consist of a retail filling station with a convenience shop, and a truck stop. The proposed filling station development site is located at the south eastern corner of the R24 / Dam Road intersection south west of Bronkhorstspuit. The closest interchanges are the N4 / R513 Road interchange located 6km north west; and the N4 / R25 interchange located 7.2 km north east of the proposed development site illustrated by the Figure 1-1 below.

Figure 1-1: Locality Plan



The road connectivity of the development site includes the N4 to the north; R42 to the east and R513 to the west. The R25 Road connects Bronkhorstspuit via Bapsfontein with Johannesburg, and the East Rand, as well as OR Tambo Airport and which provides a convenient connection between these areas to the N4 connection at Bronkhorstspuit, leading to Mpumalanga.

1.2 PURPOSE OF THE REPORT

The purpose of the study is to:

- Comply with the requirements of Stage 1 and Stage 2 of the SANRAL application process for Filling Stations alongside national roads;
- Comply with the Gauteng Department of Public Transport, Roads and Works Guidelines for Access to Filling Stations;
- Determine the impact of the changes in local traffic patterns resulting from the proposed development;
- Analyse the operation of the existing and expected traffic flows at the nearby intersection, as well as development accesses;
- Assess suitability of existing intersection control for intersections within the study area and make recommendations where appropriate; and to

- Liaise with Local Authorities, as well as Provincial Department of Transport, for provisional approval.

1.3 METHODOLOGY

This document has been prepared taking into account the following guideline documents (The viewpoint being that if the proposed development conforms to all access guidelines, the actual jurisdiction of the R25 is irrelevant):

- SANRAL Application Procedure for Direct Access to Class 3 Service Areas along National Roads;
- Gauteng Department of Public Transport, Roads and Works Guidelines for Access to Filling Stations; and the
- Committee of Transport Officials (COTO) TM17 Volume 1 September 2012 Manual.

In terms of the guidelines, the expected trip generation determines the extent of the traffic impact study. The following elements will therefore form part of this impact study.

- A description of the existing operational conditions of the road network in the immediate vicinity of the proposed development;
- Evaluation of the historic and projected growth;
- Examine available public transport, pedestrian and bicycle infrastructure;
- Review if available future public transport provision and infrastructure improvements proposed in the vicinity of the study area;
- A review of the spacing between opposing filling stations;
- A review of the Access guideline with regards to accesses along single carriageway roads;
- A review of safety sight distances of the proposed access including the stopping sight distance, deceleration required distance, sight distance for vehicles leaving the filling station, horizontal sight distance and the vertical sight distance;
- Report on the future intersection's operational condition with and without development traffic; and
- Conclusion and Recommendations based on the findings in this report.

1.4 LAND USE

The proposed developments will consist of a truck stop and filling station with small convenience shop. The convenience shop and restaurant gross leasable area is approximately 4 300 m². The geometric coordinates of the proposed development site is: 28°42'02.12"E and 25°51'28.28"E. The terrain is at an average of 1407m ASL (above sea level) and the terrain is a generally flat surface, with a 3° natural fall to the east. The entire development area is currently undeveloped.

Figure 1-2: Architects Perspective of the future Filling Station



2. STUDY AREA

2.1 STUDY INTERSECTION AND SURROUNDING ROAD NETWORK

The study intersection is the R25 and Dam Road as shown in **Figure 1-1**. The traffic from the east and west approaches along the R25 Road has a right of way, while the traffic from the south approach is stop controlled. The road network and the associated hierarchy is as follows:

- The N4 Highway is a Class 1 national road located some way north of the development site with a posted speed of 120 km/h that links Gauteng to Mpumalanga. This highway is paved and consists of two lanes per direction; and
- The R25 is a Class 2 provincial road with a posted speed of 100 km/h linking Bronkhorstspuit via Bapsfontein with Johannesburg, and the East Rand, as well as OR Tambo Airport. This provincial road is paved and consists of a single lane per direction.
- The R513 is a Class 2 provincial road which carries low volumes of traffic during critical peak hours and has a posted speed of 100 km/h. This one lane per direction provincial road is paved and is located west of the development site.
- Dam Road is a paved Class 3 or 4 local road with a posted speed of 80 km/h and is located directly west of the development site. Dam Road carries low volumes of traffic during critical peak hours and consists of one lane per direction.

2.2 OPPOSING FILLING STATIONS IN THE AREA

According to the SANRAL Policy, January 2003, the minimum allowed spacing between service areas based on Average Daily Traffic (ADT) is as shown in Table 2-1. The current ADT on the N4 Bakwena Highway adjacent the site is 7 377 vehicles per day which falls within 5 000 – 50 000 category therefore, a minimum of 30km is required between service areas.

Table 2-1: Space limits

ADT (Veh /day)	Spacing (KM)
<5 000	50
5 000 – 50 000	30
>50 000	10

2.2.1 Eastern Direction

The nearest opposing filling station in the eastbound direction is Total Godrich Motors, located in Lanham Street Bronkhorstspuit, 8.4km from the proposed development site. This large filling station is not directly located on, or visible from the R25, and it is entirely supported by the town traffic of Bronkhorstspuit.

Due to the high population and traffic density of this rapidly growing area, the proposed new filling station development will have no negative affect on Godrich Motors, and the latter will vice versa not have any competing effect on the proposed new development. The distance as well as the difference in support market and main catchment areas does not constitute a serious threat or risk to the license application.

Figure 2-1: Total Godrich



2.2.2 Western Direction

This small Soma branded filling station is located along the R25, at a distance of 13.9km west of the proposed development site. It falls well outside the local residential catchment areas of the proposed development site. Due to its small size, poor layout and lack of proper convenience facilities, this filling station will not offer what the proposed development will.

Figure 2-2: Kleinsonderhout Filling Station



2.3 SITE ACCESS AND SITE DISTANCE

It is proposed that the development be served by only one access. The only access is proposed off of Dam Road approximately 320m south of the R25 / Dam Road intersection. This access will comprise of one lane in /one lane out and will be stop controlled. It has been approved earlier for the existing fuel depot.

As the proposed developments will be situated on two separate erven, the only access will service both and this access will have to be a registered servitude road for the filling station erven as detailed in the site layout drawing, as detailed in Appendix A.

The distances with which the design of a filling station access must comply have been taken from the Gauteng Department of Public Transport and Works (November 2003) Guidelines for Access to Filling Stations and are shown in Table 2-2 below. The posted speed on Dam Road is 80 km/h and visual sight distances were measured on site.

Table 2-2: Distance with which the design of a filling station access must comply

Design speed (km/h)	Distance to perceive separate decision making points (Ss) (m)	Deceleration Distance (Sv) (m)	Gap acceptance distance for through traffic (Sv) (m)	Gap acceptance distance for turning traffic (Sg*) (m)
60	80	80	117	73
70-80	115	115	156	73
90	135	135	175	73
100	155	155	194	73
120	210	210	233	73

- This distance is independent of the design speed for the access

- Source: Table 6.3 - Gauteng Department of Public Transport and Works (November 2003) Guidelines for Access to Filling Stations

2.3.2 Required Stopping Sight Distance (Ss)

The minimum required stopping sight distance on an 80km/h road according to table 2-2 and as per the Gautrans Access Guidelines Manual is 115m between the filling station access and the intersection. The proposed filling station access is proposed 320m south of the R25 Road / Dam Road intersection on a relatively flat surrounding terrain where a vehicle approaching from either side of the intersection will be able to see a vehicle leaving the filling station from a minimum distance of 300m, which will give it enough time stop if need be.

2.3.3 Deceleration Distance (Sv)

The minimum required distance for a vehicle leaving the stream of through traffic to access the filling station and avoid rear-end collisions on a 100km/h and 80km/h road is 155m and 115m respectively. A full access is proposed off of Dam Road approximately 320m south of the R25 Road/ Dam Road.

A 120m exclusive right turn lane including taper on the south approach is proposed as shown in Drawing 01 attached in Appendix A. The proposed right turn lane will provide additional protection for vehicles accessing the filling station from the south approach.

Further to this, a 120m deceleration lane is proposed from the north approach to comply with the Gautrans Standard. In light of the above, the access will comply with the deceleration distance criteria.

2.3.4 Sight Distance for Vehicles Leaving a Filling Station (Sb)

The minimum required sight distance on 80km/h road to ensure a reasonable gap acceptance of 7 seconds is 156m according to Table 2-2. This criterion applies to both the vehicles travelling through the intersection as well as to vehicles turning at the access intersection to enter the road. The vehicle leaving the filling station will be able to see a vehicle approaching from a distance beyond the stipulated minimum 156m distance due to the flat terrain nature of the site.

2.3.5 Horizontal and Vertical Sight Distance

The terrain surrounding the study area is generally flat and therefore no vertical sight distance issues are anticipated. The minimum acceptable shoulder distance outlined in Table 2-3 below is 240m on a 80km/h road. The access location is meeting this criterion due to the flat nature of the sight. Dam Road is relatively straight and flat, which eliminates both the horizontal and vertical sight distance issues.

Table 2-3: Minimum shoulder sight distance required on road on which access is situated

Design speed (km/h)	Minimum shoulder sight distance (m)
60	180
70	210
80	240
90	270
100	300
120	360

- Source: Table 6.4 - Gauteng Department of Public Transport and Works (November 2003) Guidelines for Access to Filling Stations

3. TRAFFIC FLOW AND TRIP GENERATION

3.1 PROJECTED TRAFFIC GROWTH RATE

Historical count data information was obtained from the SANRAL yearbooks. The data used was that of station no 1235 Cultura Park located just north of the study intersection. Figure 3-2 shows the traffic growth patterns from 2011 to 2016. The 2011 to 2015 data was obtained from the SANRAL yearbooks while the 2016 data was obtained from Prodeo Business Consultants. The ADT's are as follows:

2011 SANRAL ADT	= 6 819 vehicles per day
2012 SANRAL ADT	= 6 776 vehicles per day
2013 SANRAL ADT	= 6 415 vehicles per day
2014 SANRAL ADT	= 4 727 vehicles per day
2015 SANRAL ADT	= 6 907 vehicles per day
2016 Counted ADT	= 7 377 vehicles per day

A decrease in traffic using R25 provincial road decreased between 2011 and 2014. Sections of this road were under construction as part of the rehabilitation program. Traffic management plans and restrictions in the form of STOP and GO were implemented throughout the duration of the contract which resulted in reduced traffic using this road. In light of this, the 2011 and 2016 historical data was deemed as a true reflection of traffic on this road on the R25 and was used to calculate the growth rate as follows:

$$A = P \left(1 + \frac{r}{n} \right)^{nt} \quad \begin{array}{l} A = 2016 \text{ ADT} \\ P = 2011 \text{ ADT} \\ r = \text{Growth Rate} \\ nt = \text{compounded number of years} \end{array}$$

$$7377 = 6819 \left(1 + \frac{r}{n} \right)^3$$

r = 1.59%

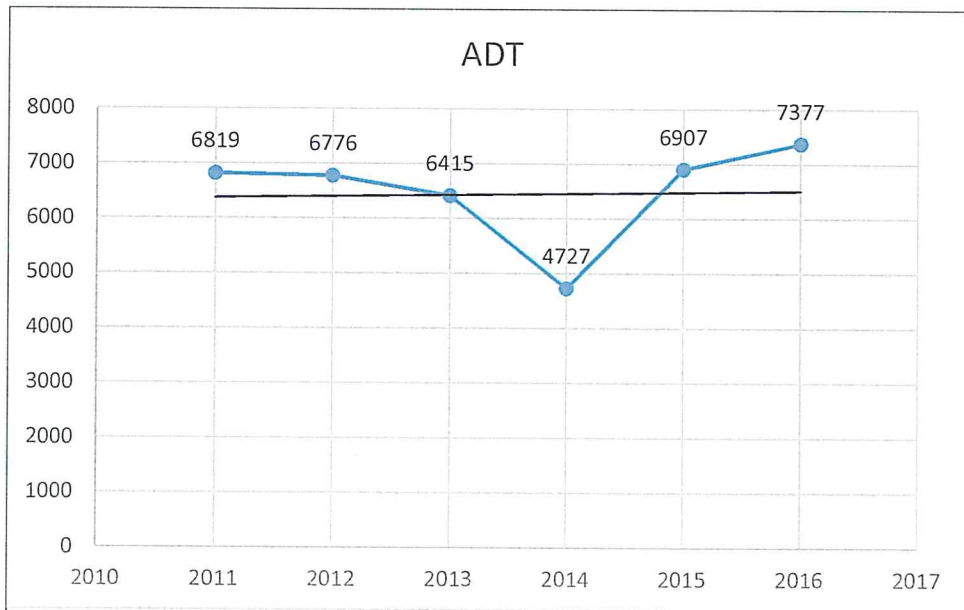


Figure 3-1: Average Daily Traffic on the R25

3.2 BACKGROUND TRAFFIC FLOW

Prodeo Business Consultants conducted a short term traffic classified count at the R25 and Dam Road intersection on the 06 April 2016. The traffic data was analysed and the results are shown in the Prodeo Business Consultants Volumetric Analysis Report attached in Appendix B. A peak factor of 12% was used to calculate the 30th highest peak hour traffic. The calculated peak hour flows were used to analyse the operations at affected intersections. Figure 3-2 depicts the 2016 flows.

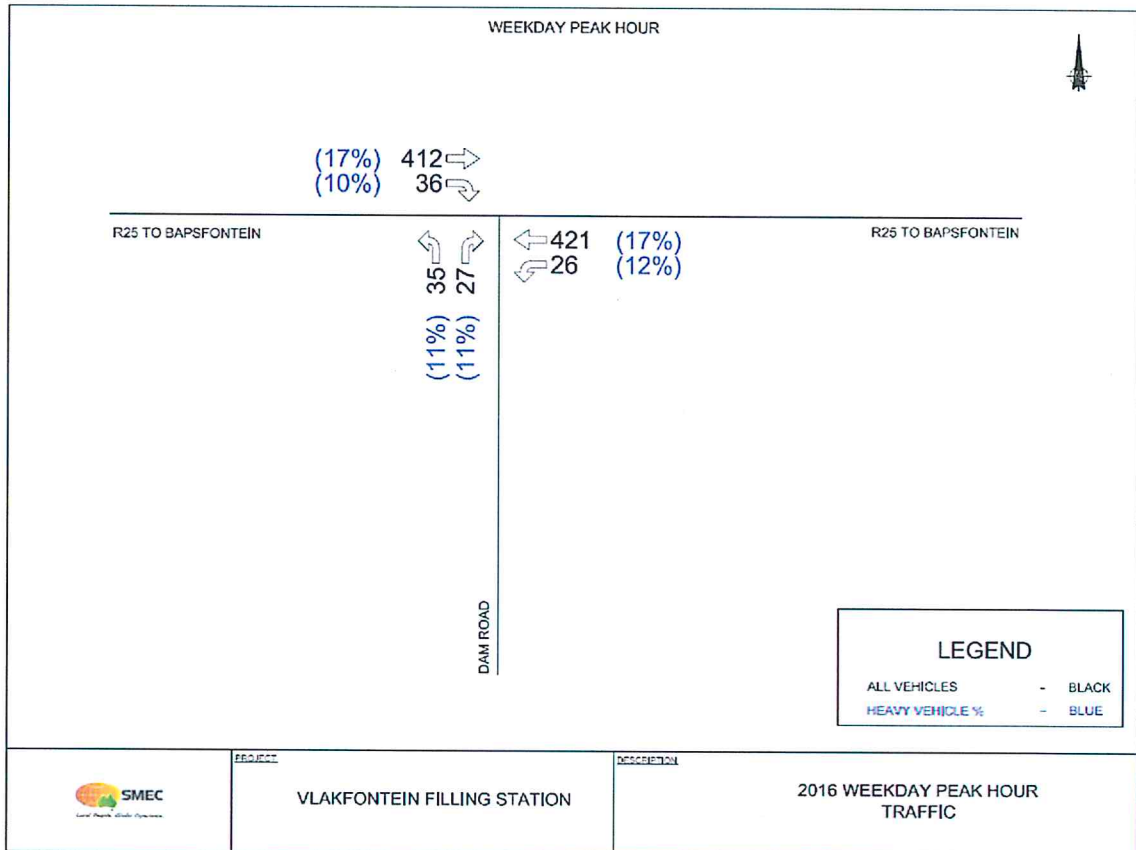


Figure 3-2: 2016 Background Traffic

3.3 TRIP GENERATION

3.3.1 Filling Station

There is little to no information regarding trip generation for Service stations in the TMH 17, South African Data Manual. According to the Department of Transport's South African Trip Generation Rates Manual, a filling station generates a volume of approximately 4% of the total peak hour traffic on the surrounding road network. Of this volume, only 16% will be new trips, while the remaining 84% will be diverted or intercepted from the surrounding road network. Tables 3-1 and 3-2 show trips that will be generated by the filling station based on the DOT South African Trip Generation Rates Manual.

It should be noted that the trip generation is based on the R25 flows while the access is proposed off of the R52 and so the anticipated trip generation maybe lower. We have however taken a conservative approach and assumed the highest trip generation.

Table 3-1: DOT SATGR Manual Light Vehicle Trip Generation

Approach Direction	Passing Traffic		Pass by Trips (84% of 4% of passing)		New Trips (16% of 4% of passing)	
	2016	2026	2016	2026	2016	2026
R25 WB	350	410	12	14	2	3
R25 EB	343	402	12	14	2	2
Dam Road NB	55	65	2	2	1	1
Dam Road SB	55	65	2	2	1	1
TOTAL	803	942	28	32	6	7

Table 3-2: DOT SATGR Manual Heavy Vehicle Trip Generation

Approach Direction	Passing Traffic		Pass by Trips (84% of 4% of passing)		New Trips (16% of 4% of passing)	
	2016	2026	2016	2026	2016	2026
R25 WB	72	85	2	3	1	2
R25 EB	69	81	2	3	1	2
R25 NB	7	9	1	2	0	0
R25 SB	7	9	1	2	0	0
TOTAL	155	184	6	10	2	4

3.3.2 Filling Station – Convenience shop

The trip generation rates used are from the TMH 17, South African Data Manual Table 3.3 for Peak Hour Trip Generation Rates and Parameters. For the purpose of this study, it is conservatively assumed that all trips generated by the convenience shop are new trips (primary trips). In light of the above, the trip generation was calculated as shown in Table 3-3.

Table 3-3: Trip Generation Table – Convenience shop

Land Use	Size (m ²)	PM Peak Rate	Total	PEAK HOUR	
				In	Out
Convenience shop	100	3.4 / 100 m ²	4	2	2
TOTAL			4	2	2

3.3.3 Summary of trips

The summaries of trips generated by the proposed development for the 2016 and 2026 planning horizons are indicated in Tables 3-6 and 3-7 below.

Table 3-4: Peak Hour Trip Generation Summary - 2016

Component	Primary Trips (new)		Pass –by Trips		TOTAL
	TRIPS IN	TRIPS OUT	TRIPS IN	TRIPS OUT	
Filling Station	4	4	34	34	76
C Store	2	2	0	0	4
TOTAL	6	6	34	34	80

Table 3-5: Peak Hour Trip Generation Summary - 2026

Component	Primary Trips (new)		Pass –by Trips		TOTAL
	TRIPS IN	TRIPS OUT	TRIPS IN	TRIPS OUT	
Filling Station	5	5	42	42	94
C Store	2	2	0	0	4
TOTAL	7	7	42	42	98

3.4 TRIP DISTRIBUTION

The trips generated by the proposed development were distributed according to the current traffic patterns. The trips were distributed as shown in Figures 3-3.

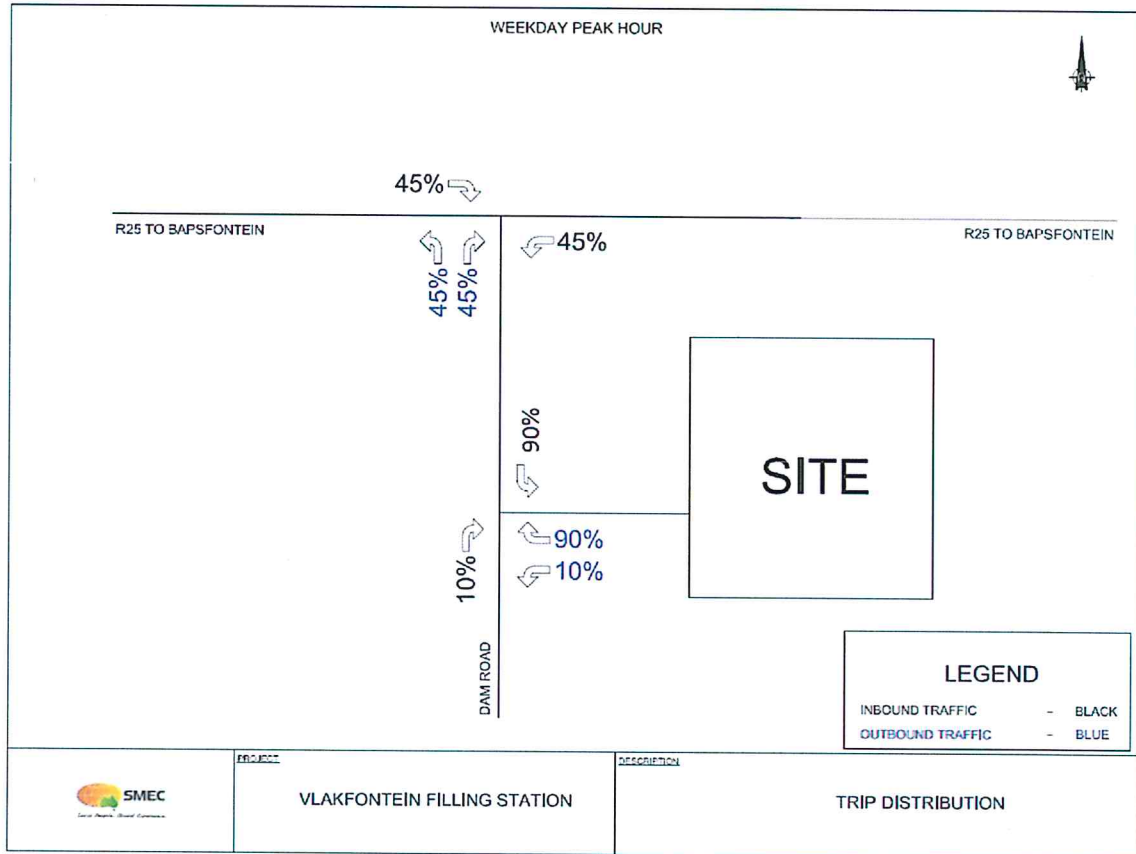


Figure 3-3: Trip Distribution

3.5 NEW TRIP ASSIGNMENT

The new trips generated by the proposed development on the road network were assigned according to the current traffic patterns. The trips were assigned as shown in figures 3-4.

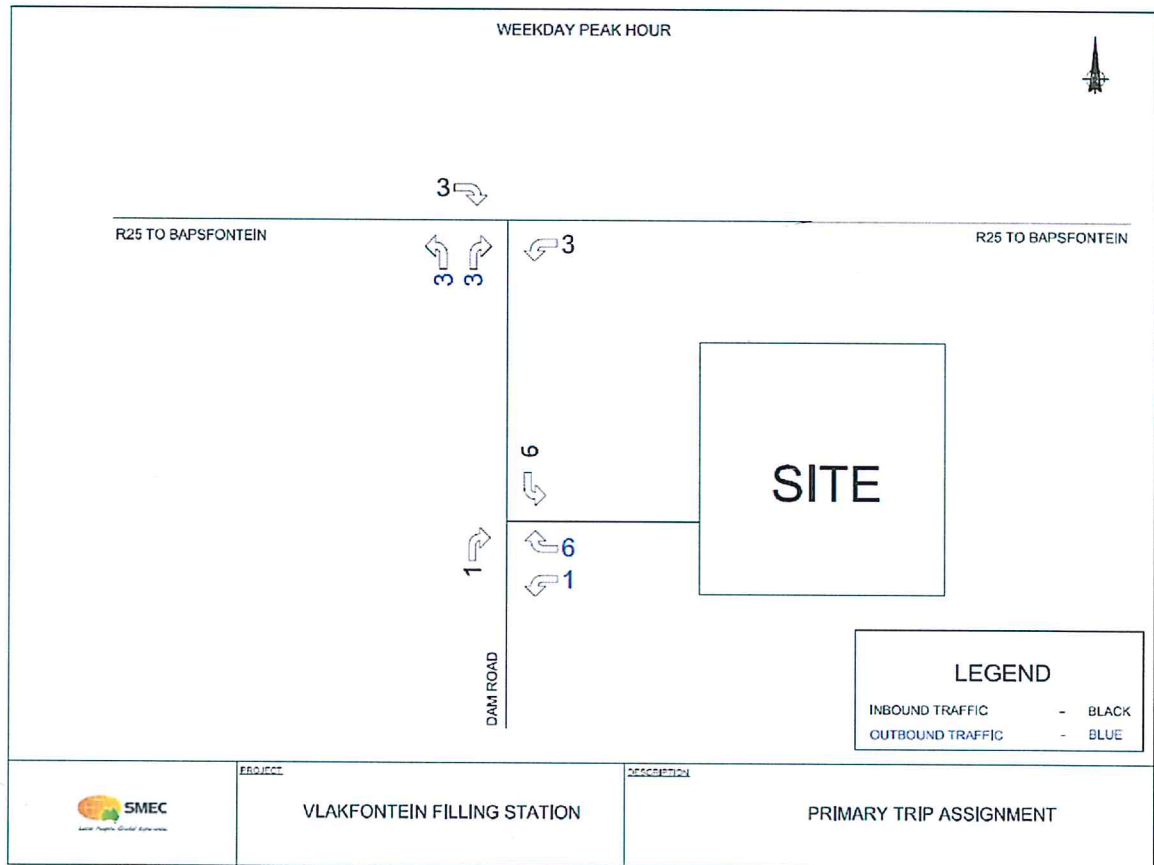


Figure 3-4: Primary Trip Assignment

3.6 2016 PASSER-BY TRIP ASSIGNMENT

Passer-by trips diverting to the proposed development in 2016 were assigned accordingly. The trips were assigned as shown in figures 3-5.

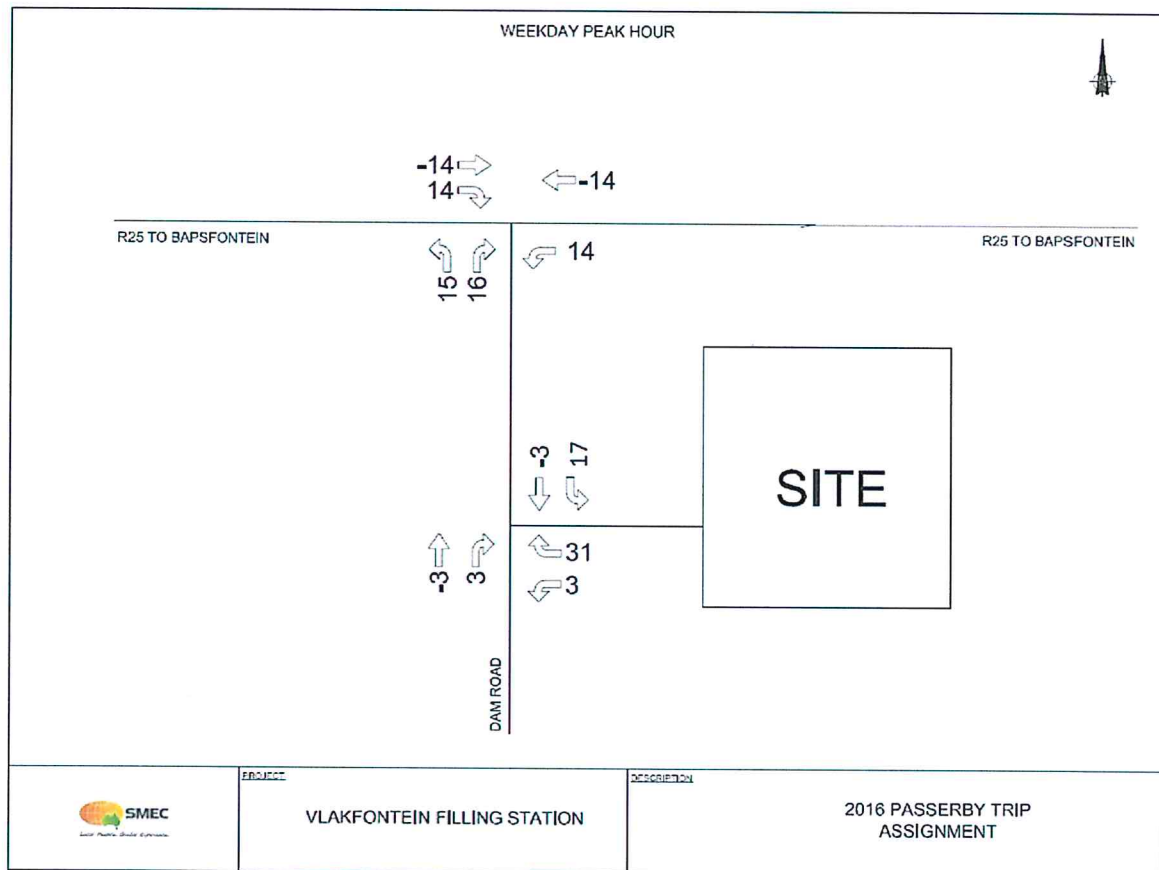


Figure 3-5: 2016 Passer-by Trip Assignment

3.7 2026 PASSER-BY TRIP ASSIGNMENT

Passer-by trips diverting to the proposed development in 2026 were assigned accordingly. The trips were assigned as shown in figures 3-6.

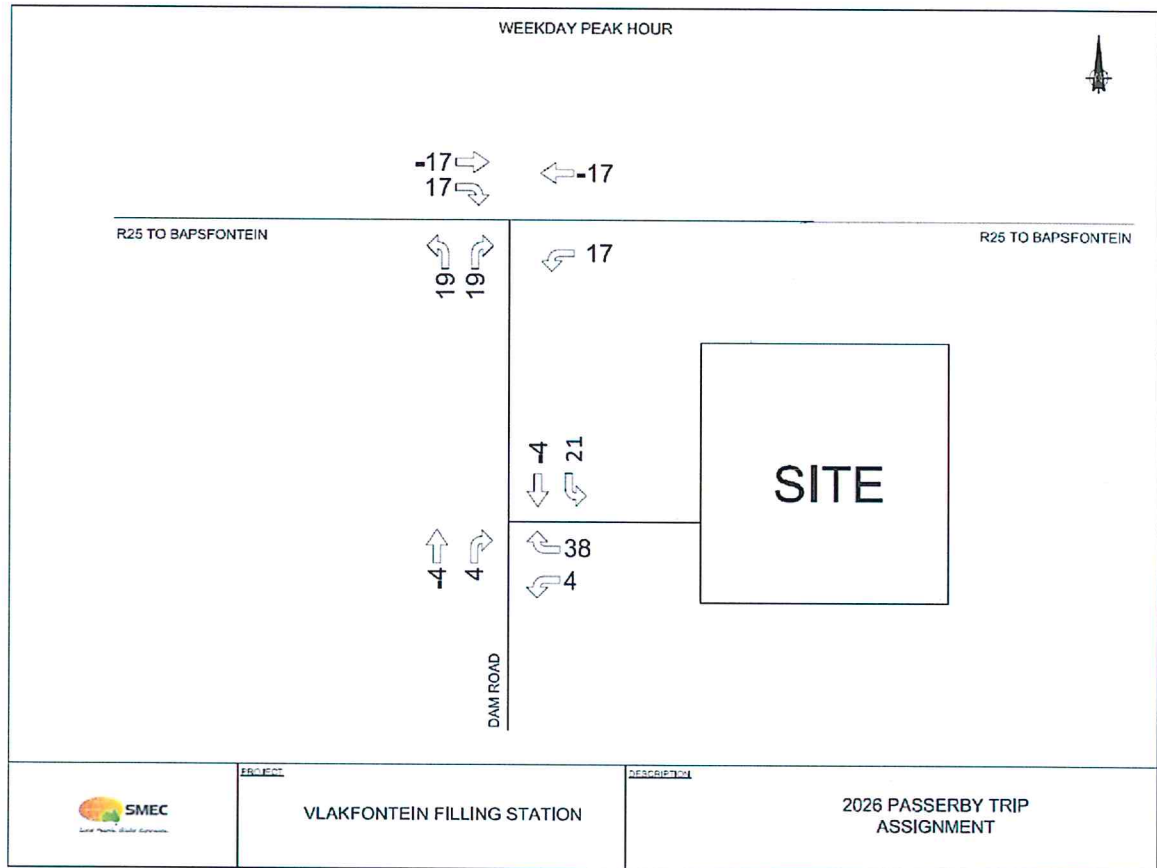


Figure 3-6: 2026 Passer-by Trip Assignment

3.8 PROJECTED 2016 + DEVELOPMENT

Using these assignments, the total projected traffic volumes including the traffic generated by the proposed development for 2016 is indicated in Figures 3-7 below.

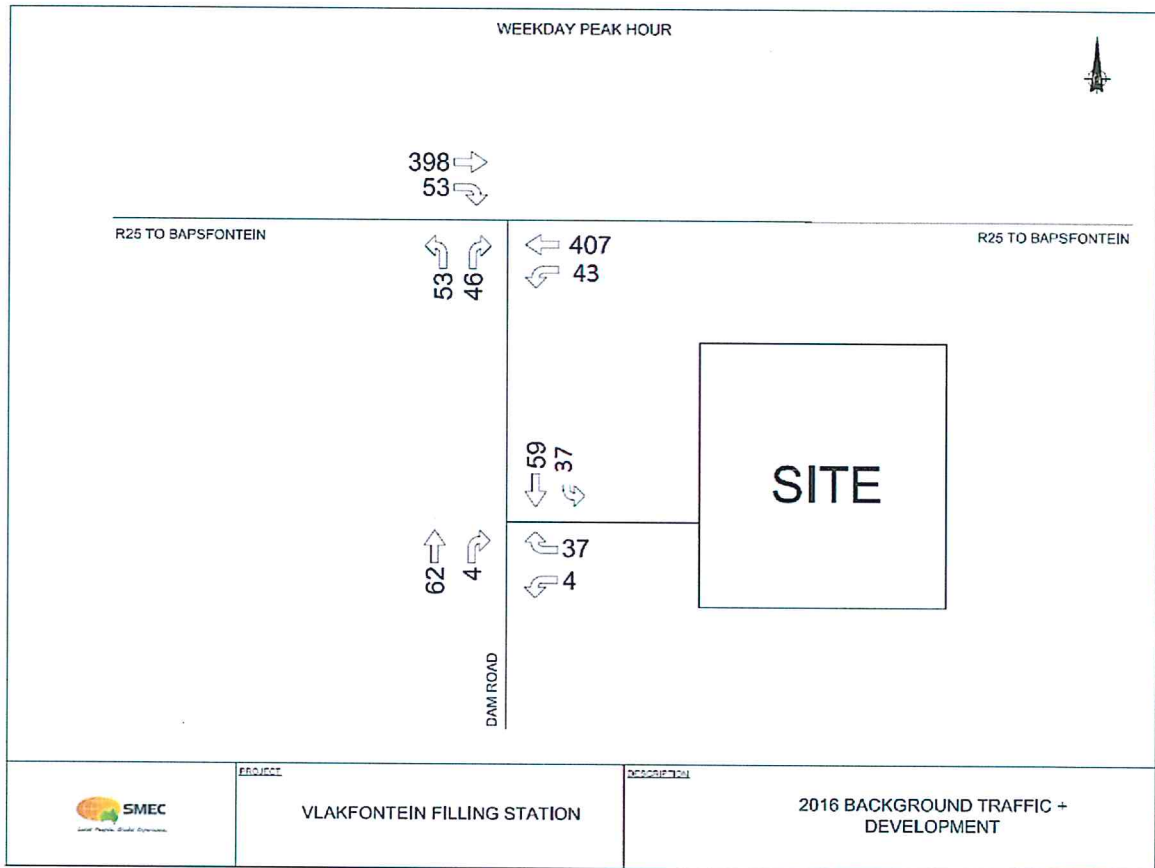


Figure 3-7: Background 2016 traffic + Development trips

3.9 PROJECTED 2026

The projected horizon year 2026 traffic volumes including the traffic generated by the proposed development is indicated in Figure 3-8 below.

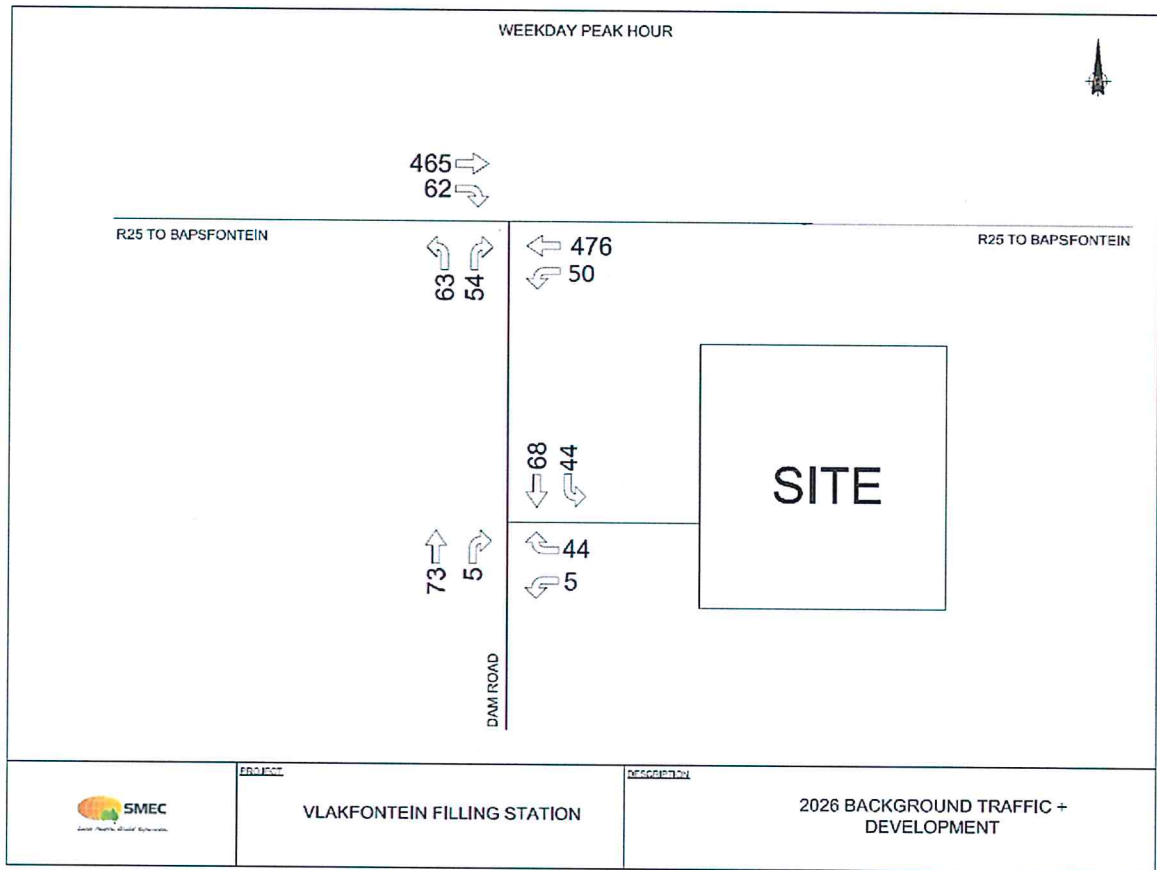


Figure 3-8: Background 2026 traffic + Development trips

4. TRAFFIC IMPACT AND CAPACITY ANALYSIS

The performance of intersections in urban road networks is defined by the level of service (LOS) for each approach to the intersection. These levels of service have been defined in the Highway Capacity Manual (HCM) (Reference 5) as shown in **Table 4-1** below. During the peak hours, the road infrastructure capacity provided should ensure that the intersection approach level of service should ideally not exceed LOS D.

Table 4-1: Level of Service Criteria (HCM)

<i>Level of Service</i>	<i>Average Approach Delay (d) for Signalised Intersections (seconds)</i>	<i>Average Approach Delay (d) for Priority Intersections (seconds)</i>
A	$d \leq 10$	$d \leq 10$
B	$10 < d \leq 20$	$10 < d \leq 15$
C	$20 < d \leq 35$	$15 < d \leq 25$
D	$35 < d \leq 55$	$25 < d \leq 35$
E	$55 < d \leq 80$	$35 < d \leq 50$
F	$80 < d$	$50 < d$

The intersection capacity analysis was conducted using SIDRA, a traffic engineering software package. The analysis was conducted at the nearby intersection as well as the access to the development for both the base (2016) and horizon (2026) years. The scenarios carried out for the analysis are discussed below:

- Scenario 1: Background traffic 2016
- Scenario 2: Background traffic 2016 + Development
- Scenario 3: Horizon traffic 2026 + Development

The results and key conclusions at each of the intersection analysed are discussed in the following paragraphs. The details of the capacity analysis are enclosed in Annexure-C.

4.1 SCENARIO 1: BACKGROUND TRAFFIC 2016

The SIDRA results are discussed below and summarised on Table 4-1.

Table 4-2: Capacity Results

INTERSECTION APPROACH	VLAKFONTEIN FILLING STATION				
	WEEKDAY PEAK				
	Delay (sec)	V/C (%)	LOS	95% queue (m)	
2016 Background Traffic					
1. R25 and Dam Road	South	13.5	11	B	2.0
	East	1.0	25	A	0.0
	North	NA	NA	NA	NA
	West	1.0	25	A	1.4
OVERALL (LOS)		A			

All approaches operate at acceptable levels of service (LOS) during the peak hour. The overall intersection is currently performing at an acceptable LOS A.

4.2 SCENARIO 2: BACKGROUND TRAFFIC 2016 + DEVELOPMENT

The SIDRA results are discussed below and summarised on Table 4-2.

Table 4-3: Capacity Results

INTERSECTION APPROACH		VLAKFONTEIN FILLING STATION			
		WEEKDAY PEAK			
		Delay (sec)	V/C (%)	LOS	95% queue (m)
2016 Background + Development Traffic					
1. R25 and Dam Road	South	12.0	20	B	3.7
	East	0.5	28	A	0.0
	North	NA	NA	NA	NA
	West	1.0	28	A	2.3
OVERALL (LOS)		A			
2. Dam Road and Filling Station Access	South	0.3	4	A	0.1
	East	9.0	5	B	1.4
	North	1.4	3	A	0.4
	West	NA	NA	NA	NA
OVERALL (LOS)		A			

All approaches will operate at acceptable levels of service (LOS) during the peak hour. The overall intersections performance is an acceptable LOS A.

4.3 SCENARIO 3: BACKGROUND TRAFFIC 2026 + DEVELOPMENT

The SIDRA results are discussed below and summarised on Table 4-3.

Table 4-4: Capacity Results

INTERSECTION APPROACH		VLAKFONTEIN FILLING STATION			
		WEEKDAY PEAK			
		Delay (sec)	V/C (%)	LOS	95% queue (m)
2026 Background + Development Traffic					
1. R25 and Dam Road	South	13.2	26	B	5.2
	East	0.5	32	A	0.0
	North	NA	NA	NA	NA
	West	1.1	31	A	2.8
OVERALL (LOS)		A			
2. Dam Road and Filling Station Access	South	0.4	4	A	0.1
	East	9.2	6	A	1.8
	North	1.5	4	A	0.5
	West	NA	NA	NA	NA
OVERALL (LOS)		A			

All approaches are expected to operate at acceptable levels of service (LOS) during the peak hour. The overall intersections performance is an acceptable LOS A.

5. ROAD INTERSECTION UPGRADES

Based on the expected trip generation and capacity analysis, it is concluded that no road geometric upgrades are required for the intersection of R25 and Dam Road. The trips generated by the proposed development do not affect this intersection in a negative way.

The filling station development access is proposed off of Dam Road approximately 320m south of the R25 / Dam Road intersection. It is proposed that the intersection be designed as per the Gauteng Department of Transport, Roads and Works standard or guidance, which states that an exclusive right turn lane, a short deceleration lane and a short acceleration lane have to be provided as shown below.

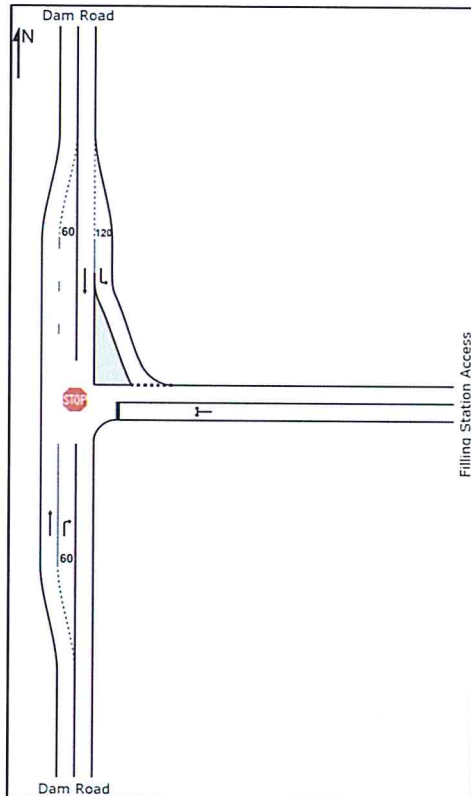


Figure 5-1: Access Layout

6. PUBLIC TRANSPORT

In terms of the National Land Transport Transition Act (Act 5 of 2009), it is required that an assessment on the public transport be included in a traffic impact assessment. The area will mainly be served by the road based public transport. At this stage, it is not envisaged that any public transport facilities will be required.

7. PARKING REQUIREMENTS

7.1 SANRAL GUIDELINES FOR PARKING PROVISION FOR FILLING STATIONS

A SANRAL general guideline for parking provision is as follows:

- Motor Vehicles; 7 spaces per every 1000 ADT at opening;
- Heavy Vehicles; 4 spaces per every 1000 ADTT at opening; and
- Buses and Coaches; 1 space per every 1000 ADBC at opening.

Table 7-1: SANRAL Parking Requirements

Mode	ADT (both directions)	Requirement	Required Parking
Motor Vehicles	6 686 vpd	7 spaces per 1000 ADT	7 x 7 = 49
Heavy Vehicles + Buses and Coaches	1 280 vpd	4 spaces per 1000 ADT	4 x 2 = 8
TOTAL			57 bays

Based on the SANRAL guidelines and requirements, a minimum of 58 bays has to be provided for the Filling Station. The parking bays should be provided as per the SANRAL guidance as follows:

- Normal parking bays : 47 bays
- Disabled parking bays : 2 bays
- Buses and Coaches parking bays: 2 bays
- Trucks : 6 bays

8. CONCLUSIONS

Given the findings of this report, the following conclusions are drawn:

- A filling station + truck stop with a convenience store is proposed on the south east corner of the R25 and Dam Road intersection in Bronkhorstspuit;
- The nearest opposing filling station in the eastbound direction is Total Godrich Motors, located in Lanham Street Bronkhorstspuit, 8.4km from the proposed development site. This large filling station is not directly located on, or visible from the R25, and it is entirely supported by the town traffic of Bronkhorstspuit.

Another small filling station is located along the R25, at a distance of 13.9km west of the proposed development site. It falls well outside the local residential catchment areas of the proposed development site. Due to its small size, poor layout and lack of proper convenience facilities, this filling station will not offer what the proposed development will;

- The proposed development will be accessed via a full access along Dam Road approximately 320m south of the R25 Road / Dam Road intersection;
- The proposed access location meets all sight distance conditions as set out in the Gauteng Department of Public Transport, Roads and Works Guidelines for Access to Filling Stations, November 2003 with a relatively flat surrounding terrain affording good visibility and sight distances;
- The access will be priority controlled and consist of one lane in and one lane out;
- The development will generate approximately 40 vph in and 40 vph leaving the development during a weekday peak hour in 2016. Only 6 vph of the trips arriving and leaving the filling station during the peak hour are new on the road network. The rest of the trips are expected to be made up of passerby trips already on the road network;
- The intersection of R25 and Dam Road operates at an acceptable level of service during the background 2016 and horizon year (2026);
- The access will comprise of an exclusive 60m right turn lane on the north approach, a 120m deceleration lane on the south approach; and a slip lane on the west approach as per the Gauteng Department of Public Transport, Roads and Works Guidelines for Access to Filling Stations, November 2003 requirements; and
- The parking provision is proposed as follows:
 - Normal parking bays : 48 bays
 - Disabled parking bays : 1 bay
 - Trucks,Buses and Coaches parking bays : 8 bays
- No geometric upgrades are required at the R25 / Dam Road intersection.

9. RECOMMENDATIONS

Given the findings of this report, it is recommended that the proposed development be considered favourably from a traffic engineering point of view, as the development will have a minimal impact on the surrounding road network.

Appendix A



NOTES:

NEW BUILDINGS:

TOTAL FOOTPRINT:

10640m² + 3107m²

TOTAL = 13 747m²

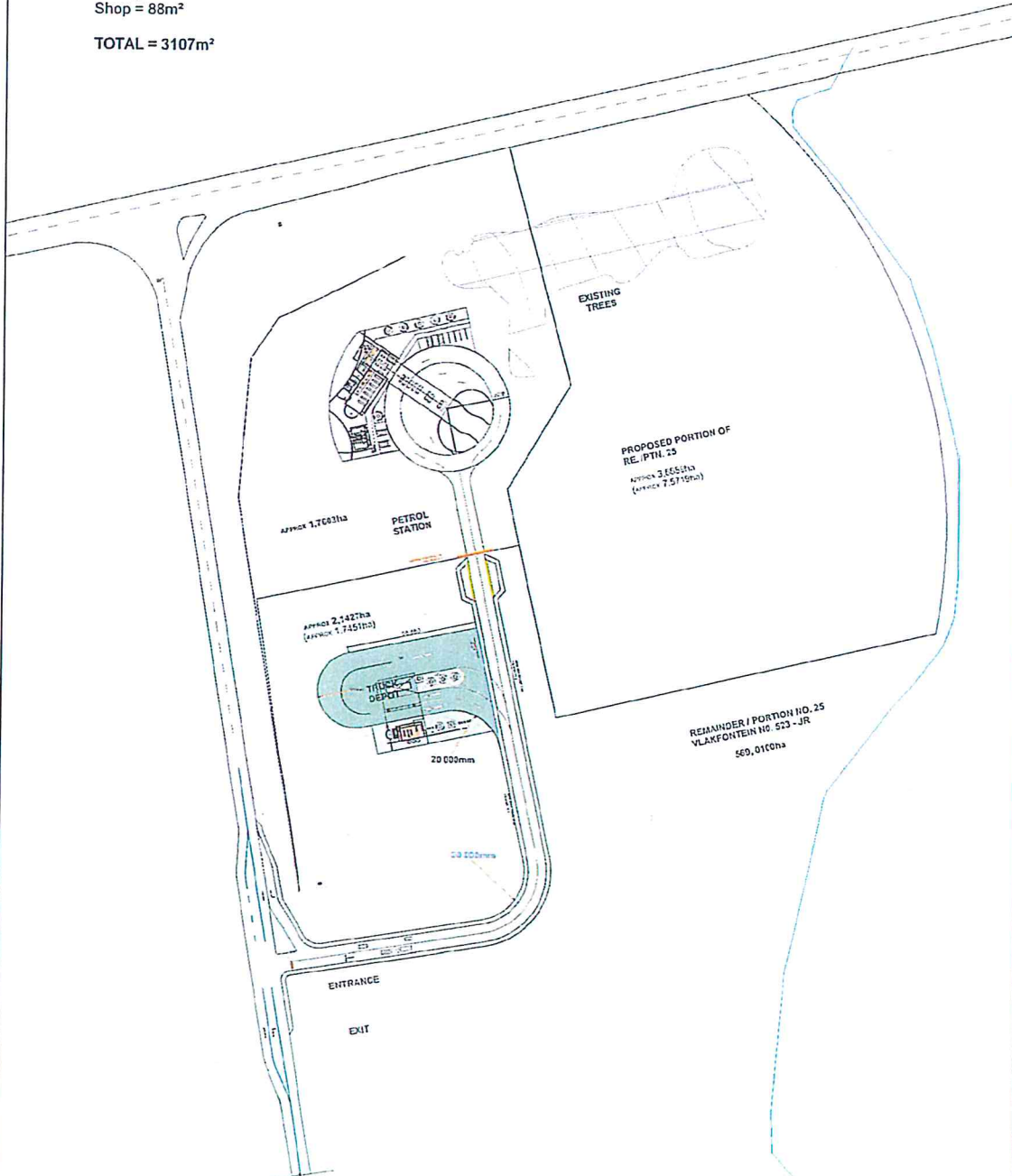
AREA OF TRUCK DEPOT:

Concrete slab = 2359m²

Paving = 660m²

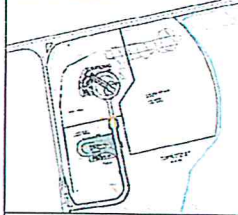
Shop = 88m²

TOTAL = 3107m²




SITE LAYOUT SKETCH PLAN
SCALE 1:500

KEY PLAN - SCALE 1:5000



APPROVED	
DATE	



SAFETY AND HEALTH
DATE 10/10/2022
PROJECT NO. 2022-000000
TEL: 081 451 4000
FAX: 081 451 4000
WWW.SMEC.CO.ZA



NO.	DESCRIPTION	DATE	BY	FOR	STATUS
1	AS SHOWN	2022-00-00	AT	AS SHOWN	CONCEPT
2	REVISION				
3					
4					
5					

PROJECT	NO.	REV.	DATE
JT	00	26	A
DATE	NO.	REV.	DATE
DRG	00	00	00

SITE LAYOUT

Appendix B



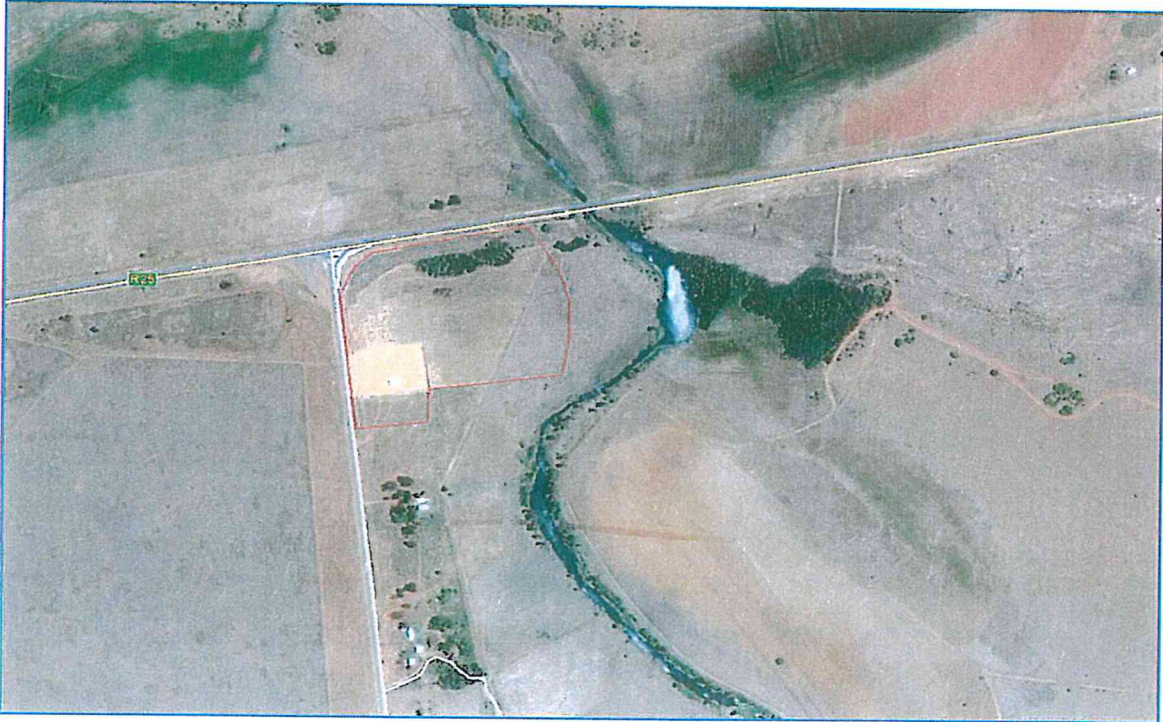
JCJ Developments

Phase 1

TRAFFIC STUDY, VOLUMETRIC ANALYSIS AND ECONOMIC VIABILITY
ASSESSMENT

Vlakfontein Vulstasie Project ref: PDP.1601

Development of a new filling station with convenience store
R25 Route Vlakfontein - Bronkhorstspuit
Gauteng



Specialist Consultants for the retail fuel industry

Sales/Branding/Development/Valuations/Licensing of Filling Stations & Truck Stops

DEDICATED FOCUSED CONSISTENT



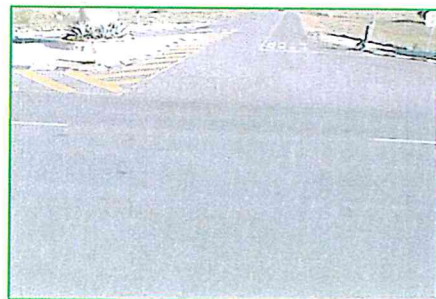
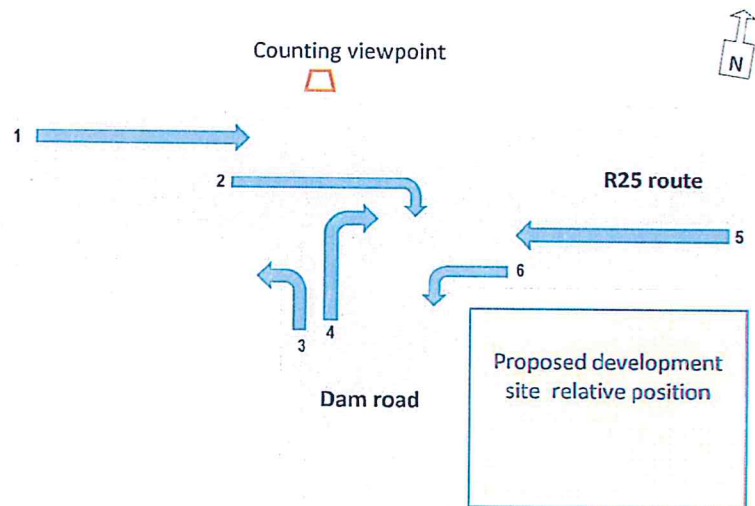
INTRODUCTION

JCJ Developments appointed Prodeo Business Consultants to conduct a traffic study, and to perform a volumetric analysis and economic viability assessment for the envisaged development of a new retail filling station with convenience shop.

SCOPE AND PURPOSE OF THE STUDY

- * Conduct a traffic count to determine a realistic average daily number of light and heavy vehicles travelling past the envisaged development site
- * Perform a volumetric analysis based on industry standards and benchmarks, as well as specific site conditions, to determine a figure of expected petrol and diesel sales that a generic type filling station would realistically be able to sell at the site
- * Calculate and forecast development costs, turnover, income and expenses of the new filling station and convenience shop, (according to industry standards and actual recent developments) for the first operating year as well as for a projected 10 years, in order to calculate the Net Present Value and Internal Rate of Return of the capital investment in order to form an opinion of the potential viability of the project.

TRAFFIC ROUTE LAYOUT



TRAFFIC DATA RESULT

Site Identifier:	PDP.1601	Site Number:	001
Site Name:	R25 Bronkhorstspuit	Site Description:	Rur
Physical Lanes:	6	Intersection type:	T junction
GPS Longitude:	25°51'28.28"S	GPS Latitude:	28°42'.02.12"E
Installation Date:	2016/04/06	Termination Date:	2016/04/13
Speed Limit:	120km/hr	Companion Site:	None
Province:	Gauteng	Municipality:	Kungwini
Town:	Bronkhorstspuit	SANRAL Region:	Northern

TRAFFIC HIGHLIGHTS OF SITE PDP.1601

	Route	R 1	R 2	R 3	R 4	R 5	R 6	Total
Total number of vehicles		24 003	2 086	2 037	1 547	24 577	1 512	55 762
Number of counting days		7	7	7	7	7	7	7
Total number of Light vehicles		2 860	267	258	196	2 914	191	6 686
Total number of Trucks		569	31	33	25	597	25	1 280
Average daily traffic (ADT)		3 429	298	291	221	3 511	216	7 966
positive flow weight % of route		80%	100%	90%	90%	100%	100%	
Discounted ADT positive flow weight		2 743	298	262	199	3 511	216	7 229
(Discounted) ADT - Light vehicles		2 288	267	232	176	2 914	191	6 069
(Discounted) % Light vehicles		83%	90%	89%	89%	83%	88%	84%
(Discounted) ADT - Heavy vehicles		455	31	30	23	597	25	1 160
(Discounted) % Trucks		17%	10%	11%	11%	17%	12%	16%
Truck split % (short) 2 axles		26.9%	87.1%	81.8%	72.0%	27.0%	76.0%	31.6%
ADT short (2 axle) trucks		153	27	27	18	161	19	405
Truck split % (medium) 3 axles		36.6%	12.9%	18.2%	24.0%	37.2%	20.0%	35.2%
ADT medium (3 axle) trucks		208	4	6	6	222	5	451
Truck split % (long) 4+ axles		36.6%	0.0%	0.0%	4.0%	35.8%	4.0%	33.1%
ADT long (4+ axle) trucks		208	0	0	1	214	1	424
Average speed light vehicles (kmh)		89.4	13.3			77.2	24.2	
Average speed heavy vehicles (kmh)		49.5	9.8			51.1	10.6	
Route		R 1	R 2	R 3	R 4	R 5	R 6	Total

* Positive flow weight % : Refers to the ease or difficulty that customers may experience in terms of access to the site, from different lanes and directions of travel, in relation to the specific position of the site.

The higher the positive flow weight %, the easier and more convenient it is for customers to enter the premises

VOLUMETRIC ANALYSIS

PDP.1601

CALCULATION OF PETROL VOLUMES

Route	R 1	R 2	R 3	R 4	R 5	R 6	Total
% of light vehicles using petrol	84%	84%	84%	84%	84%	84%	
Number of light vehicles using petrol	1 922	224	195	148	2 448	160	5 098
% of heavy vehicles using petrol	0%	0%	0%	0%	0%	0%	
Number of heavy vehicles using petrol	0	0	0	0	0	0	
Total number of vehicles using petrol	1 922	224	195	148	2 448	160	5 098
% of traffic entering premises	22%	22%	22%	22%	22%	22%	
Vehicles entering premises	423	49	43	33	539	35	1 121
% of entering vehicles buying fuel	25%	25%	25%	25%	25%	25%	
Number of vehicles buying fuel	106	12	11	8	135	9	280
Average litres per purchase	23.5	23.5	23.5	23.5	23.5	23.5	
Average litres per day	2 484	290	252	192	3 164	207	6 589
Average trading days per month	28.5	28.5	28.5	28.5	28.5	28.5	28.5
Average litres per month	70 796	8 262	7 185	5 458	90 166	5 910	187 777

CALCULATION OF DIESEL VOLUMES

Route	R 1	R 2	R 3	R 4	R 5	R 6	Total
% of light vehicles using diesel	16%	16%	16%	16%	16%	16%	
Number of light vehicles using diesel	366	43	37	28	466	31	971
% of heavy vehicles using diesel	100%	100%	100%	100%	100%	100%	
Number of heavy vehicles using diesel	455	31	30	23	597	25	911
Total number of vehicles using diesel	821	74	67	51	1 063	56	1 057
% of traffic entering premises	18%	18%	18%	18%	18%	18%	
Vehicles entering premises	148	13	12	9	191	10	159
% of entering vehicles buying fuel	35%	35%	35%	35%	35%	35%	
Number of vehicles buying fuel	52	5	4	3	67	4	70
Average litres per purchase	55	55	55	55	55	55	
Average litres per day	2 846	255	232	176	3 684	193	3 138
Average trading days per month	28.5	28.5	28.5	28.5	28.5	28.5	171
Average litres per month	81 103	7 280	6 602	5 009	104 998	5 487	210 479

SUMMARY OF FUEL VOLUMES

Route	R 1	R 2	R 3	R 4	R 5	R 6	Total
Total average daily traffic	2 743	298	262	199	3 511	216	7 229
Vehicles entering premises	571	63	55	42	730	45	1 505
Vehicles purchasing fuel	157	17	15	11	202	12	415
Average litres petrol per month	70 796	8 262	7 185	5 458	90 166	5 910	187 777
Average litres diesel per month	81 103	7 280	6 602	5 009	104 998	5 487	210 479
Average litres all fuel per month	151 900	15 542	13 787	10 467	195 164	11 397	398 256

LIST + EXPLANATION OF TERMS & ABBREVIATIONS

ULP 93	Unleaded petrol 93 octane
ULP 95	Unleaded petrol 95 octane
50ppm diesel	diesel with maximum sulphur content of 50 parts per million
500ppm diesel	diesel with maximum sulphur content of 500 parts per million
RAS	Regulated Accounting System introduced in the retail fuel industry from 4 Dec 2013
Mibco	Motor Industries Bargaining Council - All employees must be registered.
CDF	Cash deposit fees, charged by commercial banks for over-the-counter deposits at all branches

LIST OF UNDERLYING ASSUMPTIONS

Annual growth rate of traffic (increase in litres)	6.0%	Convenience shop sales ratio (turnover per litre fuel sales)	1.10
Expected ULP 93 % of all petrol sales	65%	Convenience shop sales annual growth rate (industry standard)	8.0%
Expected ULP 95 % of all petrol sales	35%	Fast food sales ratio (turnover per litre fuel sales)	1.00
Expected 50ppm % of all diesel sales	55%	Fast food sales ratio annual growth rate (industry standard)	6.0%
Expected 500ppm % of all diesel sales	45%	Utility card sales ratio (turnover per litre fuel sales)	0.85
Petrol evaporation rate (industry standard)	2%	Utility card sales ratio annual growth rate (industry standard)	6.0%
Diesel evaporation rate (industry standard)	0.5%	Convenience shop gross profit margin (industry standard)	30%
Lubricants sales ratio (litres of fuel per 500ml oil)	98	Fast food gross profit margin (industry standard)	48%
Adopted selling price per 500ml oil in year 1	42.50	Utility card sales gross profit margin (industry standard)	4%
Shrinkage on lubricant products (industry standard)	1%	Convenience shop shrinkage rate (industry standard)	2%
Gross margin per litre petrol (RAS) Year 1 (2018)	1.95	Fast foods shrinkage rate (industry standard)	4%
Gross margin per litre 50ppm diesel (2018)	1.88	Months 1 - 4 litres turnover (%) of expected 12th month achievement	55%
Gross margin per litre 500ppm diesel (2018)	1.76	Months 5 - 8 litres turnover (%) of expected 12th month achievement	75%
Growth rate of all fuel gross margin (industry standard)	6%	Months 9 - 12 litres turnover (%) of expected 12th month achievement	100%
Growth rate (%) of Lubricant sales (industry standard)	8%	Gross profit margin on lubricant sales (industry standard)	30%
Adopted annual growth in fuel prices	10%	Adopted average number of trading days per month	28.5
Forecourt recovery (cents per litre) RAS standard	0.48	Cash deposit fees (per R100) average of major banks for 2014	5.15
Fuel attendants ratio (litres per required attendant)	25 000	Card machines - merchant rate (average of major banks for 2014)	3.50%
Number of other employees (per fuel attendant)	1	Franchise levies (%) non-fuel (shop) sales (industry average)	9.50%
Annual growth rate of wages (2014 industry agreement)	9.50%	Fuel attendants wages/hour (2014 industry agreement) +9% growth	32.17
Mibco contribution (% of wages)	15.50%	Other employees wages per hour (2014 agreement) +9% growth	27.08
Skills development levy (% of wages)	1.00%	Average working hours per month	176
Accounting & Audit fees (industry standard)	4 000	Unemployment Insurance fund (% of wages+ salaries)	1.00%
Advertising & Promotion (industry standard)	2 400	Cleaning & Consumables (industry standard)	2 850
Insurance (industry standard)	9 500	Water & Electricity (industry standard)	33 000
Maintenance & Gardens (industry standard)	1 500	Telephone/Fax/Internet (industry standard)	2 750
Office & Computer (industry standard)	2 200	Fuel Guarantee (industry standard)	5 500
Growth rate in general expenses (industry average)	11.00%	Security (industry standard)	22 000
Admin salaries annual growth rate (industry standard)	10.00%	Staff + training provision per employee/month (industry standard)	92.00
Uniforms provision per employee per month	65.00	Average % portion of total turnover from cash purchases in first year	65%
% portion of turnover from EFT payments in first year	15%	Average % portion of total turnover from card purchases in first year	20%

NOTES

- Reference to "industry standard" is based on averages of actual figures from more than 30 filling stations taken over the last 24 months.
- Since it is illegal to sell fuel on credit, the establishment of "pre-paid" or "depositor" accounts mostly by industrial and commercial clients became common practice in the retail fuel industry. These customers normally pay by way of electronic transfers (eft).
The ratio of cash, card and eft payments of the total turnover of a new filling station is adopted at 65%, 20% and 15% respectively at the onset. This ratio normally changes slightly over time as the number of depositor accounts increase, card sales increase in relation to cash purchases
- To allow for a realistic start and growth of turnover of the new filling station in year one, turnover of the 12th month was used as a benchmark, and turnover figures of 55% for months one to four, 75% for months five to eight and 100% for the remainder are adopted

FIRST YEAR BUDGETED INCOME (2018)

Month	1	2	3	4	5	6	7	8	9	10	11	12	YEAR	Average
ULP 93 petrol	67 130	67 130	67 130	67 130	91 541	91 541	91 541	91 541	122 055	122 055	122 055	122 055	1 122 909	93 576
ULP 95 petrol	36 147	36 147	36 147	36 147	49 292	49 292	49 292	49 292	65 722	65 722	65 722	65 722	604 643	50 387
Petrol sales (litres)	103 278	103 278	103 278	103 278	140 833	140 833	140 833	140 833	187 777	187 777	187 777	187 777	1 727 552	143 963
margin per litre (RAS)	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05		
Gross profit value	211 719	211 719	211 719	211 719	288 708	288 708	288 708	288 708	384 944	384 944	384 944	384 944	3 541 481	295 123
Evaporation @1%	2 117	2 117	2 117	2 117	2 887	2 887	2 887	2 887	3 849	3 849	3 849	3 849	35 415	2 951
Gross profit on petrol	209 602	209 602	209 602	209 602	285 821	285 821	285 821	285 821	381 094	381 094	381 094	381 094	3 506 066	292 172
50ppm diesel	63 670	63 670	63 670	63 670	86 822	86 822	86 822	86 822	115 763	115 763	115 763	115 763	1 065 022	88 752
Gross margin per litre	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88		
Gross profit value	119 699	119 699	119 699	119 699	163 226	163 226	163 226	163 226	217 635	217 635	217 635	217 635	2 002 242	166 853
500ppm diesel	52 093	52 093	52 093	52 093	71 037	71 037	71 037	71 037	94 715	94 715	94 715	94 715	871 382	72 615
Gross margin per litre	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76		
Gross profit value	91 685	91 685	91 685	91 685	125 024	125 024	125 024	125 024	166 699	166 699	166 699	166 699	1 533 632	127 803
Total (litres) Diesel	115 763	115 763	115 763	115 763	157 859	157 859	157 859	157 859	210 479	210 479	210 479	210 479	1 936 404	161 367
Gross profit value	211 384	211 384	211 384	211 384	288 251	288 251	288 251	288 251	384 334	384 334	384 334	384 334	3 535 874	294 656
Evaporation @.5%	1 057	1 057	1 057	1 057	1 441	1 441	1 441	1 441	1 922	1 922	1 922	1 922	17 679	1 473
Gross profit on diesel	210 327	210 327	210 327	210 327	286 809	286 809	286 809	286 809	382 412	382 412	382 412	382 412	3 518 195	293 183
Total Litres Petrol	103 278	103 278	103 278	103 278	140 833	140 833	140 833	140 833	187 777	187 777	187 777	187 777	1 727 552	143 963
Total Litres Diesel	115 763	115 763	115 763	115 763	157 859	157 859	157 859	157 859	210 479	210 479	210 479	210 479	1 936 404	161 367
Total Litres Fuel	219 041	219 041	219 041	219 041	298 692	298 692	298 692	298 692	398 256	398 256	398 256	398 256	3 663 956	305 330
Gross profit all fuel	419 929	419 929	419 929	419 929	572 630	572 630	572 630	572 630	763 507	763 507	763 507	763 507	7 024 261	585 355
Fuel t/o per 500ml lubricant	98	98	98	98	98	98	98	98	98	98	98	98		
units 500ml lubricant	2 235	2 235	2 235	2 235	3 048	3 048	3 048	3 048	4 064	4 064	4 064	4 064	37 387	3 116
selling price per 500ml	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50		
Lubricants Sales	94 992	94 992	94 992	94 992	129 535	129 535	129 535	129 535	172 713	172 713	172 713	172 713	1 588 960	132 413
Gross profit margin	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%		
Gross profit value	28 498	28 498	28 498	28 498	38 860	38 860	38 860	38 860	51 814	51 814	51 814	51 814	476 688	39 724
Shrinkage @ 2%	570	570	570	570	777	777	777	777	1 036	1 036	1 036	1 036	9 534	794
Lubricants gross profit	27 928	27 928	27 928	27 928	38 083	38 083	38 083	38 083	50 778	50 778	50 778	50 778	467 154	38 930
Shop t/o per litre fuel	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	13	1
Convenience Shop t/o	240 945	240 945	240 945	240 945	328 561	328 561	328 561	328 561	438 082	438 082	438 082	438 082	4 030 351	335 863
Gross profit %	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	4	0
Gross profit value	72 283	72 283	72 283	72 283	98 568	98 568	98 568	98 568	131 424	131 424	131 424	131 424	1 209 105	100 759
Shrinkage @ 2%	1 445	1 446	1 446	1 446	1 971	1 971	1 971	1 971	2 628	2 628	2 628	2 628	24 182	2 015
Shop gross profit	70 838	70 838	70 838	70 838	96 597	96 597	96 597	96 597	128 796	128 796	128 796	128 796	1 184 923	98 744
Fast food t/o per litre fuel	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12	1
Fast food t/o	219 041	219 041	219 041	219 041	298 692	298 692	298 692	298 692	398 256	398 256	398 256	398 256	3 663 956	305 330
Gross profit %	48.00%	48.00%	48.00%	48.00%	48.00%	48.00%	48.00%	48.00%	48.00%	48.00%	48.00%	48.00%	5	0
Gross profit value	105 140	105 140	105 140	105 140	143 372	143 372	143 372	143 372	191 163	191 163	191 163	191 163	1 758 699	146 558
Shrinkage @ 4%	4 206	4 206	4 206	4 206	5 735	5 735	5 735	5 735	7 647	7 647	7 647	7 647	70 348	5 852
Fast food gross profit	100 934	100 934	100 934	100 934	137 637	137 637	137 637	137 637	183 516	183 516	183 516	183 516	1 688 351	140 695
Utility cards t/o per litre fuel	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	10	1
Utility card sales t/o	186 185	186 185	186 185	186 185	253 888	253 888	253 888	253 888	338 518	338 518	338 518	338 518	3 114 362	259 530
Gross profit %	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	0	0
Utility cards gross profit	7 447	7 447	7 447	7 447	10 155	10 155	10 155	10 155	13 541	13 541	13 541	13 541	124 574	10 381
Mcnth	1	2	3	4	5	6	7	8	9	10	11	12		
Gross operating profit	627 076	627 076	627 076	627 076	855 103	855 103	855 103	855 103	1 140 137	1 140 137	1 140 137	1 140 137	10 489 264	874 105

FIRST YEAR BUDGETED OPERATING EXPENSES

Month	1	2	3	4	5	6	7	8	9	10	11	12		
Actual total turnover (rand)	4 026 775	4 026 775	4 026 775	4 026 775	5 491 057	5 491 057	5 491 057	5 491 057	7 321 405	7 321 405	7 321 405	7 321 405	67 356 966	5 613 081
cash portion (%)	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%	65%		
Total cash to bank	2 617 404	2 617 404	2 617 404	2 617 404	3 569 187	3 569 187	3 569 187	3 569 187	4 758 516	4 758 516	4 758 516	4 758 516	43 782 028	3 648 502
CDF Fees per R100	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15		
Cash deposit costs	134 756	134 756	134 756	134 756	183 813	183 813	183 813	183 813	245 094	245 094	245 094	245 094	2 254 774	187 898
% Card sales	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%		
Actual total card sales	805 355	805 355	805 355	805 355	1 095 211	1 095 211	1 095 211	1 095 211	1 464 282	1 464 282	1 464 282	1 464 282	13 471 393	1 122 616
Merchant rate	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%		
Merchant cost	28 187	28 187	28 187	28 187	38 437	38 437	38 437	38 437	51 250	51 250	51 250	51 250	471 499	39 292
Cash in transit	6 500	6 500	6 500	6 500	6 500	6 500	6 500	6 500	6 500	6 500	6 500	6 500	78 000	6 500
Total Banking Costs	169 484	169 484	169 484	169 484	228 751	228 751	228 751	228 751	302 834	302 834	302 834	302 834	2 804 273	233 689
Petrol sales (total litres)	103 278	103 278	103 278	103 278	140 833	140 833	140 833	140 833	187 777	187 777	187 777	187 777	1 727 552	143 963
Forecourt recovery per litre	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48		
Forecourt rental recovery	49 573	49 573	49 573	49 573	67 600	67 600	67 600	67 600	90 133	90 133	90 133	90 133	829 225	69 102
Shop + Fast food turnover	459 666	459 666	459 666	459 666	627 253	627 253	627 253	627 253	836 338	836 338	836 338	836 338	7 664 307	641 192
franchise levies %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
Franchise levies	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accounting & Audit fees	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	48 000	4 000
Advertising & Promotion	2 400	2 400	2 400	2 400	2 400	2 400	2 400	2 400	2 400	2 400	2 400	2 400	28 800	2 400
Insurance	9 500	9 500	9 500	9 500	9 500	9 500	9 500	9 500	9 500	9 500	9 500	9 500	114 000	9 500
Maintenance & Gardens	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	1 500	18 000	1 500
Office & Computer	2 200	2 200	2 200	2 200	2 200	2 200	2 200	2 200	2 200	2 200	2 200	2 200	26 400	2 200
Cleaning & Consumables	2 850	2 850	2 850	2 850	2 850	2 850	2 850	2 850	2 850	2 850	2 850	2 850	34 200	2 850
Water & Electricity	33 000	33 000	33 000	33 000	33 000	33 000	33 000	33 000	33 000	33 000	33 000	33 000	396 000	33 000
Telephone/Fax/Internet	2 750	2 750	2 750	2 750	2 750	2 750	2 750	2 750	2 750	2 750	2 750	2 750	33 000	2 750
Fuel Guarantee	5 500	5 500	5 500	5 500	5 500	5 500	5 500	5 500	5 500	5 500	5 500	5 500	66 000	5 500
Security	22 000	22 000	22 000	22 000	22 000	22 000	22 000	22 000	22 000	22 000	22 000	22 000	264 000	22 000
Development loan repayment	116 458	116 458	116 458	116 458	116 458	116 458	116 458	116 458	116 458	116 458	116 458	116 458	1 397 494	116 458
Total other expenses	251 731	251 731	251 731	251 731	269 758	269 758	269 758	269 758	292 291	292 291	292 291	292 291	3 255 118	271 260
Management & Admin salaries	45 000	45 000	45 000	45 000	45 000	45 000	45 000	45 000	45 000	45 000	45 000	45 000	540 000	45 000
Fuel attendants	12	12	12	12	12	12	12	12	12	12	12	12		
Rate per hour	32.17	32.17	32.17	32.17	32.17	32.17	32.17	32.17	32.17	32.17	32.17	32.17		
Average hours p/m	176	176	176	176	176	176	176	176	176	176	176	176		
Forecourt wages	69 150	69 150	69 150	69 150	69 150	69 150	69 150	69 150	69 150	69 150	69 150	69 150	829 801	69 150
Other employees	12	12	12	12	12	12	12	12	12	12	12	12		
Rate per hour	27.08	27.08	27.08	27.08	27.08	27.08	27.08	27.08	27.08	27.08	27.08	27.08		
Average hours p/m	176	176	176	176	176	176	176	176	176	176	176	176	2 112	176
Other wages	58 209	58 209	58 209	58 209	58 209	58 209	58 209	58 209	58 209	58 209	58 209	58 209	698 508	58 209
Wages total	127 359	127 359	127 359	127 359	127 359	127 359	127 359	127 359	127 359	127 359	127 359	127 359	1 528 309	127 359
Mibco	19 741	19 741	19 741	19 741	19 741	19 741	19 741	19 741	19 741	19 741	19 741	19 741	236 888	19 741
Skills & Development levy	1 274	1 274	1 274	1 274	1 274	1 274	1 274	1 274	1 274	1 274	1 274	1 274	15 283	1 274
UIF	1 274	1 274	1 274	1 274	1 274	1 274	1 274	1 274	1 274	1 274	1 274	1 274	15 283	1 274
Uniforms	806	806	806	806	806	806	806	806	806	806	806	806	9 673	806
Staff & Training expenses	1 136	1 136	1 136	1 136	1 136	1 136	1 136	1 136	1 136	1 136	1 136	1 136	13 630	1 136
Total Labour cost	166 589	166 589	166 589	166 589	166 589	166 589	166 589	166 589	166 589	166 589	166 589	166 589	2 359 066	196 589
Month	1	2	3	4	5	6	7	8	9	10	11	12		
OPERATING EXPENSES	617 804	617 804	617 804	617 804	695 097	695 097	695 097	695 097	791 714	791 714	791 714	791 714	8 418 458	701 533
NET OPERATING PROFIT	9 272	9 272	9 272	9 272	150 005	150 005	150 005	150 005	348 424	348 424	348 424	348 424	2 076 865	172 567

10 YEAR BUDGETED INCOME

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
ULP 93 petrol	1 122 909	1 501 280	1 538 812	1 577 282	1 616 714	1 657 132	1 698 550	1 741 024	1 784 550	1 829 164
ULP 95 petrol	604 643	808 382	828 591	849 306	870 539	892 302	914 609	937 475	960 912	984 934
Petrol sales (litres)	1 727 552	2 309 661	2 367 403	2 426 588	2 487 253	2 549 434	2 613 170	2 678 499	2 745 462	2 814 098
margin per litre (RAS)	2.05	2.21	2.39	2.58	2.79	3.01	3.25	3.51	3.79	4.10
Gross profit value	3 541 481	5 113 590	5 660 745	6 266 444	6 936 954	7 679 208	8 500 833	9 410 478	10 417 399	11 532 060
Evaporation @2%	70 830	102 272	113 215	125 329	138 739	153 584	170 018	188 210	208 348	230 641
Gross profit on petrol	3 470 651	5 011 319	5 547 530	6 141 115	6 798 215	7 525 624	8 330 855	9 222 268	10 209 051	11 301 419
50ppm diesel	1 065 022	1 423 888	1 459 486	1 495 973	1 533 372	1 571 706	1 610 999	1 651 274	1 692 556	1 734 870
Gross margin per litre	1.88	2.03	2.19	2.37	2.56	2.76	2.98	3.22	3.48	3.76
Gross profit value	2 002 242	2 891 063	3 200 407	3 542 850	3 921 935	4 341 583	4 806 132	5 320 388	5 869 659	6 519 864
500ppm diesel	871 382	1 165 000	1 194 125	1 223 978	1 254 577	1 285 942	1 318 090	1 351 042	1 384 818	1 419 439
Gross margin per litre	1.76	1.90	2.05	2.22	2.39	2.59	2.79	3.02	3.26	3.52
Gross profit value	1 533 632	2 214 431	2 451 375	2 713 673	3 004 036	3 325 467	3 681 292	4 075 191	4 511 236	4 993 938
Total (litres) Diesel	1 936 404	2 588 888	2 653 610	2 719 951	2 787 949	2 857 648	2 929 089	3 002 317	3 077 374	3 154 309
Gross profit value	3 535 874	5 105 494	5 651 782	6 256 523	6 925 971	7 667 050	8 487 424	9 395 579	10 400 906	11 513 803
Evaporation @.5%	17 679	25 527	28 259	31 283	34 630	38 335	42 437	46 978	52 005	57 569
Gross profit on diesel	3 518 195	5 079 967	5 623 523	6 225 240	6 891 341	7 628 715	8 444 987	9 348 601	10 348 901	11 456 234
Total Litres Fuel	3 663 956	4 868 550	5 021 013	5 146 539	5 275 202	5 407 082	5 542 259	5 680 816	5 822 836	5 968 407
Average litres per month	305 330	408 212	418 418	428 878	439 600	450 590	461 855	473 401	485 236	497 357
Gross profit all fuel	6 998 846	10 091 286	11 171 053	12 366 356	13 689 556	15 154 338	16 775 853	18 570 869	20 557 952	22 757 653
Fuel t/o per 500ml lubricant	98	98	98	98	98	98	98	98	98	98
units 500ml lubricant	37 387	49 985	51 235	52 516	53 829	55 174	56 554	57 963	59 417	60 902
selling price per 500ml	42.50	46.75	51.43	55.57	62.22	68.45	75.29	82.82	91.10	100.21
Lubricants Sales	1 588 960	2 336 808	2 634 751	2 970 682	3 349 444	3 776 498	4 258 001	4 800 897	5 413 011	6 103 170
Gross profit margin	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Gross profit value	476 688	701 042	790 425	891 205	1 004 833	1 132 949	1 277 400	1 440 269	1 623 903	1 830 951
Shrinkage @ 2%	9 534	14 021	15 809	17 824	20 097	22 659	25 548	28 805	32 478	36 619
Lubricants gross profit	467 154	687 022	774 617	873 380	984 736	1 110 290	1 251 852	1 411 464	1 591 425	1 794 332
Shop t/o per litre fuel	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Convenience Shop t/o	4 030 351	5 388 404	5 523 115	5 661 192	5 802 722	5 947 790	6 096 465	6 248 897	6 405 120	6 565 248
Gross profit %	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
Gross profit value	1 209 105	1 616 521	1 656 934	1 698 358	1 740 817	1 784 337	1 828 946	1 874 669	1 921 536	1 969 574
Shrinkage @ 2%	24 182	32 330	33 139	33 967	34 816	35 687	36 579	37 493	38 431	39 391
Shop gross profit	1 184 923	1 584 191	1 623 796	1 654 391	1 706 000	1 748 650	1 792 367	1 837 176	1 883 105	1 930 183
Fast food t/o per litre fuel	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fast food t/o	3 663 956	4 899 550	5 021 013	5 146 539	5 275 202	5 407 032	5 542 259	5 680 816	5 822 836	5 968 407
Gross profit %	48.00%	48.00%	48.00%	48.00%	48.00%	48.00%	48.00%	48.00%	48.00%	48.00%
Gross profit value	1 758 699	2 351 304	2 410 086	2 470 339	2 532 097	2 595 399	2 660 284	2 726 792	2 794 961	2 864 835
Shrinkage @ 4%	70 348	94 052	96 403	98 814	101 284	103 816	106 411	109 072	111 798	114 593
Fast food gross profit	1 688 351	2 257 252	2 313 683	2 371 525	2 430 813	2 491 583	2 553 873	2 617 720	2 683 163	2 750 242
Utility cards t/o per litre fuel	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Utility card sales t/o	3 114 362	4 163 767	4 267 861	4 374 558	4 483 922	4 596 020	4 710 920	4 828 693	4 949 411	5 073 146
Gross profit %	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
Utility cards gross profit	124 574	166 551	170 714	174 982	179 357	183 841	188 437	193 148	197 976	202 920
Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Gross operating profit	10 453 849	14 786 300	16 053 863	17 450 634	18 990 463	20 688 703	22 552 381	24 630 376	26 913 621	29 435 335

10 YEAR BUDGETED OPERATING EXPENSES

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Actual total turnover	57 356 956	59 817 544	113 599 145	129 524 059	147 869 581	159 125 050	163 636 558	221 976 479	254 749 651	232 346 355
cash portion (%)	65%	60%	55%	50%	48%	46%	44%	42%	40%	40%
Total cash to bank	43 782 028	59 850 765	52 479 530	54 782 033	70 987 191	77 797 532	65 200 279	93 230 951	101 859 740	117 359 555
Cash deposit costs	2 079 646	2 844 811	2 957 778	3 076 197	3 371 892	3 695 383	4 047 013	4 423 471	4 840 190	5 560 281
% Card sales	20%	22%	24%	25%	26%	30%	32%	34%	36%	36%
Actual total card sales	13 471 393	21 659 945	27 263 795	33 675 257	41 409 165	50 737 521	61 563 839	75 472 553	91 709 856	105 352 700
Merchant rate	3.50%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Merchant cost	471 499	658 798	817 914	1 010 288	1 242 276	1 522 126	1 858 915	2 264 180	2 751 265	3 150 581
Cash in transit	78 000	85 410	93 524	102 409	112 138	122 791	134 456	147 229	161 216	176 531
Total Banking Costs	2 629 145	3 589 020	3 879 215	4 188 893	4 726 305	5 340 299	6 040 384	6 839 880	7 752 672	8 897 394
Petrol sales (total litres)	1 727 552	2 309 681	2 367 403	2 426 588	2 487 253	2 549 434	2 613 170	2 678 499	2 745 462	2 814 098
Forecourt recovery per litre	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Forecourt rental recovery	829 225	1 108 637	1 136 353	1 164 762	1 193 881	1 223 728	1 254 322	1 285 680	1 317 822	1 350 767
Shop + Fast food turnover	7 594 307	10 286 954	10 544 128	10 807 731	11 077 924	11 354 872	11 638 744	11 929 713	12 227 956	12 533 655
franchise levies %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Franchise levies	0	0	0	0	0	0	0	0	0	0
Accounting & Audit fees	48 000	52 560	57 553	63 021	69 008	75 563	82 742	90 602	99 210	106 635
Advertising & Promotion	28 800	31 536	34 532	37 812	41 405	45 333	49 645	54 361	59 526	65 181
Insurance	114 000	124 830	136 689	149 674	163 893	179 463	195 512	215 181	235 623	258 007
Maintenance & Gardens	18 000	19 710	21 582	23 633	25 878	28 335	31 028	33 976	37 204	40 738
Office & Computer	26 400	28 908	31 654	34 661	37 954	41 560	45 508	49 831	54 565	59 749
Cleaning & Consumables	34 200	37 449	41 007	44 902	49 168	53 839	58 954	64 554	70 687	77 402
Water & Electricity	396 000	433 620	474 814	519 921	569 314	623 399	682 621	747 470	818 480	896 236
Telephone/Fax/Internet	33 000	36 135	39 568	43 327	47 443	51 950	56 885	62 289	68 207	74 686
Fuel Guarantee	66 000	72 270	79 136	86 654	94 866	103 900	113 770	124 578	136 413	149 373
Security	264 000	289 080	316 543	346 614	379 542	415 599	455 081	498 314	545 653	597 490
Development loan repayment	1 397 494	1 397 494	1 397 494	1 397 494	1 397 494	1 397 494	1 397 494	1 397 494	1 397 494	1 397 494
Total other expenses	3 255 118	3 632 229	3 766 924	3 912 476	4 069 865	4 240 169	4 424 562	4 624 331	4 840 883	5 075 758
Management & Admin salaries	540 000	591 300	647 474	708 993	776 337	850 089	930 847	1 019 278	1 116 109	1 222 140
Fuel attendants	12	16	17	17	18	18	18	19	19	20
Rate per hour	32.17	35.23	38.57	42.24	46.25	50.64	55.45	60.72	66.49	72.81
Average hours p/year	2 112	2 112	2 112	2 112	2 112	2 112	2 112	2 112	2 112	2 112
Forecourt wages	829 801	1 214 802	1 363 463	1 530 317	1 717 589	1 927 779	2 163 691	2 428 473	2 725 657	3 059 210
Other employees	12	12	12	12	12	12	12	12	12	12
Rate per hour	27.08	29.65	32.47	35.55	38.93	42.63	46.68	51.11	55.97	61.29
Average hours p/year	2112	2112	2112	2112	2112	2112	2112	2112	2112	2112
Other wages	698 508	764 857	837 529	917 094	1 004 218	1 099 619	1 204 083	1 318 470	1 443 725	1 580 879
Wages total	1 528 309	1 979 659	2 200 992	2 447 411	2 721 807	3 027 398	3 367 774	3 746 943	4 169 382	4 640 089
Mibco	236 888	306 849	341 154	379 349	421 880	469 247	522 005	580 776	646 254	719 214
Skills & Development levy	15 283	19 797	22 010	24 474	27 218	30 274	33 678	37 469	41 594	46 401
UIF	15 283	19 797	22 010	24 474	27 218	30 274	33 678	37 469	41 594	46 401
Uniforms	9 673	10 592	11 598	12 700	13 906	15 227	16 674	18 258	19 992	21 892
Staff & Training expenses	13 630	14 925	16 343	17 895	19 595	21 457	23 495	25 727	28 171	30 848
Total Labour cost	2 359 066	2 942 927	3 261 579	3 615 266	4 007 962	4 443 966	4 928 151	5 465 921	6 063 297	6 726 983
Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
OPERATING EXPENSES	8 243 330	10 164 175	10 907 719	11 716 655	12 804 132	14 024 434	15 393 097	16 930 133	18 656 852	20 700 134
NET OPERATING PROFIT	2 210 519	4 622 125	5 146 144	5 733 980	6 186 330	6 664 270	7 169 285	7 700 243	8 256 769	8 735 201
CUMULATIVE	2 210 519	6 832 644	11 978 788	17 712 768	23 899 099	30 563 368	37 732 652	45 432 895	53 689 664	62 424 865
AVERAGE PER MONTH	184 210	365 177	428 845	477 832	515 528	555 356	597 440	641 687	688 064	727 933

ESTIMATED DEVELOPMENT COST

NOTE

Estimated development costs as below are based on actual quotations and/or physical costs for a total of 5 similar new development projects during the last 24 months

It is envisaged that a contracted branding fuel supplier shall contribute towards the specific items as listed, subject to the requirements of a supply and branding agreement

MAIN BUILDING (300m²)

DESCRIPTION	Estimated Cost	REMARKS
Foundation structure	320 000	
Concrete floors	300 000	
Brickwork	650 000	
Ceilings	225 000	
Roof structure complete	570 000	
Floor finishings	140 000	
Wall finish (paint, tiling)	210 000	interior and exterior
Plumbing complete	200 000	
Structural steelwork	350 000	
Doors, locks, etc.	130 000	
Aluminium windows, shopfronts, entrance door, glass, etc.	450 000	
Electrical to building (allowance)	80 000	
External facade features, etc.	320 000	subject to specific architectural design
Sundries	300 000	
Sub Total	4 245 000	

EXTERNAL WORKS

DESCRIPTION	Estimated Cost	REMARKS
Earthworks, roads, paving, etc.	1 200 000	subject to final terrain layout plans
Yard walls, gates, etc.	300 000	
Walkways paving	250 000	subject to final terrain layout plans
Landscaping (allowance)	120 000	
Sundry Site works	200 000	
Sub Total	2 070 000	

FORECOURT

DESCRIPTION	Estimated Cost	REMARKS
Canopy	850 000	
Forecourt electrical	80 000	Fuel company
Site lighting, electrical, etc.	78 000	Fuel company
Air conditioning system	100 000	
Pump & Tank Installation (including computerized systems)	3 500 000	Fuel company
Compressors and compressed air installation	165 000	Fuel company
CCTV system & Installation	125 000	
Signage and Pylon with display lighting	850 000	Fuel company
Sub Total	5 748 000	

SHOPFITTING AND EQUIPMENT

DESCRIPTION	Estimated Cost	REMARKS
Fittings and Equipment	220 000	
Computerized till system, office computers, printers etc.	120 000	Fuel company normally contributes 50%
Cold-room, Display freezers, etc.	180 000	
Timber shelving, counters, etc.	85 000	
Staff lockers, etc.	60 000	
Sub Total	665 000	

SERVICES

DESCRIPTION	Estimated Cost	REMARKS
Water supply connection	25 000	subject to availability from local municipality
Sewerage connection	60 000	subject to availability from local municipality
Sub Total	85 000	

PROFESSIONAL FEES

DESCRIPTION	Estimated Cost	REMARKS
Provision for deposits and connection fees	60 000	
EIA Process and approvals	400 000	
Site and retail license application costs	120 000	
Other professional fees	300 000	
Sub Total	880 000	
Total Estimated development cost	13 693 000	
Expected contribution by contracted fuel supplying company	4 733 000	
Estimated direct cost to Developer	8 960 000	

Calculation and Assumption Report

Net Present Value (NPV)

The difference between the present value of cash inflows and the present value of cash outflows.

NPV is used in capital budgeting to analyse the profitability of an investment or project.

NPV analysis is sensitive to the reliability of future cash inflows that an investment or project will yield.

Internal Rate of Return (IRR)

The discount rate often used in capital budgeting that makes the net present value of all cash flows from a particular project equal to zero.

The IRR can therefore be considered as the rate of growth a project is expected to generate, and is often compared against prevailing rates of return, offered by different investment opportunities and markets.

Generally speaking, the higher a project's internal rate of return, the more desirable it is to undertake the project.

NOTE

Cost of land as well as present and future value of land is not included in this assumption report

Expenditure and value in terms of any non-profit-generating moveable assets were not taken in consideration

Net Present Value (NPV) Internal Rate of Return (IRR)

Term in years	Expenses			Cash flows			Estimated Value of Operating Rights
	Capital Expenditure	Operating Expenses	Total	Gross Operating	Year	Cumulative	
0	8 960 000	0	8 960 000		-8 960 000	-8 960 000	
1		8 243 330	8 243 330	10 453 849	2 210 519	-6 749 481	-302 133
2		10 164 175	10 164 175	14 786 300	4 622 125	-2 127 356	11 353 842
3		10 907 719	10 907 719	16 053 863	5 146 144	3 018 788	18 028 374
4		11 716 655	11 716 655	17 450 634	5 733 980	8 752 768	25 476 875
5		12 804 132	12 804 132	18 990 463	6 186 330	14 939 098	32 982 562
6		14 024 434	14 024 434	20 688 703	6 664 270	21 603 368	41 040 821
7		15 393 097	15 393 097	22 562 381	7 169 285	28 772 652	49 683 066
8		16 930 133	16 930 133	24 630 376	7 700 243	36 472 895	58 931 938
9		18 656 852	18 656 852	26 913 621	8 256 769	44 729 664	68 811 908
10		20 700 134	20 700 134	29 435 335	8 735 201	53 464 865	78 942 534
				NPV =	53 464 865		
				IRR =	48.64%		

CONCLUSIONS & RECOMMENDATIONS

- * Results from the traffic count and volumetric analysis indicate that there is sufficient transient and local traffic support to justify the development of a filling station.
- * Conservative projections of future income and expenses shows that the envisaged business would be able to service a development loan of R9million over ten year period, at 9.5% interest rate.
- * The results of the NPV and IRR calculation indicate a very attractive investment opportunity, and the proposed development plans are considered economic viable

From the above, it recommended that the developer consider proceeding with the development


Please note that the results of this report does not in any way constitute a guarantee that the proposed development and/or subsequent retail business operation will be approved and/or be successful in any way, financially, or otherwise.



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Director
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Appendix C

MOVEMENT SUMMARY

 Site: 101 [R25/Dam Rd A1]

2016 Background Traffic
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dam Road											
1	L2	37	11.0	0.060	12.0	LOS B	0.2	1.6	0.51	0.95	49.6
3	R2	28	11.0	0.164	29.0	LOS D	0.5	4.1	0.84	1.00	40.6
Approach		65	11.0	0.164	19.4	LOS C	0.5	4.1	0.65	0.97	45.2
East: R25 East											
4	L2	27	12.0	0.016	5.7	LOS A	0.0	0.0	0.00	0.52	54.5
5	T1	443	17.0	0.252	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		471	16.7	0.252	0.4	NA	0.0	0.0	0.00	0.03	59.6
West: R25 West											
11	T1	434	17.0	0.171	0.3	LOS A	0.4	3.4	0.10	0.05	59.1
12	R2	38	10.0	0.171	8.1	LOS A	0.4	3.4	0.19	0.09	56.3
Approach		472	16.4	0.171	0.9	NA	0.4	3.4	0.11	0.05	58.9
All Vehicles		1007	16.2	0.252	1.9	NA	0.5	4.1	0.09	0.10	58.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 101 [R25/Dam Rd A2]

2016 Background Traffic + Development
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dam Road											
1	L2	56	11.0	0.089	11.9	LOS B	0.3	2.4	0.50	0.96	49.7
3	R2	48	11.0	0.276	31.6	LOS D	1.0	7.6	0.86	1.03	39.5
Approach		104	11.0	0.276	21.0	LOS C	1.0	7.6	0.67	0.99	44.4
East: R25 East											
4	L2	45	12.0	0.026	5.7	LOS A	0.0	0.0	0.00	0.52	54.5
5	T1	428	17.0	0.244	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		474	16.5	0.244	0.6	NA	0.0	0.0	0.00	0.05	59.4
West: R25 West											
11	T1	419	17.0	0.176	0.4	LOS A	0.6	4.6	0.14	0.07	58.8
12	R2	56	10.0	0.176	8.0	LOS A	0.6	4.6	0.27	0.14	55.7
Approach		475	16.2	0.176	1.3	NA	0.6	4.6	0.15	0.08	58.4
All Vehicles		1053	15.8	0.276	2.9	NA	1.0	7.6	0.13	0.16	57.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 101 [R25/Dam Rd A3]

2026 Background Traffic + Development
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Sat'n v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dam Road											
1	L2	66	11.0	0.120	13.0	LOS B	0.4	3.2	0.55	1.00	49.0
3	R2	57	11.0	0.468	49.6	LOS E	1.7	13.3	0.93	1.08	33.1
Approach		123	11.0	0.468	29.9	LOS D	1.7	13.3	0.72	1.03	40.1
East: R25 East											
4	L2	53	12.0	0.031	5.7	LOS A	0.0	0.0	0.00	0.52	54.5
5	T1	501	17.0	0.285	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		554	16.5	0.285	0.6	NA	0.0	0.0	0.00	0.05	59.4
West: R25 West											
11	T1	489	17.0	0.210	0.6	LOS A	0.8	6.2	0.16	0.07	58.6
12	R2	65	10.0	0.210	8.7	LOS A	0.8	6.2	0.31	0.15	55.4
Approach		555	16.2	0.210	1.5	NA	0.8	6.2	0.17	0.08	58.2
All Vehicles		1232	15.8	0.468	3.9	NA	1.7	13.3	0.15	0.16	56.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 101 [Dam Rd/ Filling Station Access A1]

2016 + Development
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Del. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dam Rd South											
2	T1	65	10.0	0.036	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R2	4	2.0	0.002	5.6	LOS A	0.0	0.1	0.15	0.55	52.6
Approach		69	9.5	0.036	0.3	NA	0.0	0.1	0.01	0.03	59.5
East: Filling Station Access											
4	L2	4	2.0	0.052	8.4	LOS A	0.2	1.4	0.28	0.88	51.4
6	R2	39	2.0	0.052	9.1	LOS A	0.2	1.4	0.28	0.88	51.2
Approach		43	2.0	0.052	9.0	LOS A	0.2	1.4	0.28	0.88	51.2
North: Dam Road North											
7	L2	39	2.0	0.024	5.6	LOS A	0.1	0.7	0.03	0.54	54.1
8	T1	62	10.0	0.034	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		101	6.9	0.034	2.2	LOS A	0.1	0.7	0.01	0.21	57.6
All Vehicles		214	6.8	0.052	3.0	NA	0.2	1.4	0.07	0.29	56.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: 101 [Dam Rd/ Filing Station Access A2]

2026 + Development
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dam Rd South											
2	T1	77	10.0	0.042	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R2	5	2.0	0.003	5.7	LOS A	0.0	0.1	0.17	0.55	52.6
Approach		82	9.5	0.042	0.4	NA	0.0	0.1	0.01	0.03	59.5
East: Filing Station Access											
4	L2	5	2.0	0.064	8.4	LOS A	0.2	1.8	0.31	0.88	51.3
6	R2	46	2.0	0.064	9.3	LOS A	0.2	1.8	0.31	0.88	51.1
Approach		52	2.0	0.064	9.2	LOS A	0.2	1.8	0.31	0.88	51.1
North: Dam Road North											
7	L2	46	2.0	0.029	5.6	LOS A	0.1	0.8	0.03	0.53	54.1
8	T1	72	10.0	0.039	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		118	6.9	0.039	2.2	LOS A	0.1	0.8	0.01	0.21	57.5
All Vehicles		252	6.7	0.064	3.1	NA	0.2	1.8	0.07	0.29	56.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.