Hazia Filling Station Development

ENVIRONMENTAL IMPACT ASSESSMENT
DRAFT BASIC ASSESSMENT REPORT
Executive Summary

DATE MAY 2017

Compiled by:

Setala Environmental
P.O. Box 36593
Menlopark, 0102
Contact person:
Mientjie Coetzee
Tel +27(0)83 253 2246
Fax +27(0)86 675 4026
Email mientjie@setalaenvironmental.co.za

Applicant:

Munghana Leisure and Tourism(Pty) Ltd
9 Heide Road
Kempton Park, 1619
Contact person:
Mr. Jack Bruce Malebane
Tel +27(
Fax +27(0) 11 578 5304
Email jackm@akafin.co.za

setala

Executive Summary

1 INTRODUCTION

Munghana Leisure and Tourism (Pty) Ltd (the applicant) appointed **Setala Environmental** as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for the proposed Hazia Filling Station and associated infrastructure on Portion 24 (a Portion of Portion 5) of the farm HAZIA 240 JP. The proposed filling station forms part of the proposed Zeerust X 5 development.

The site is located approximately 2km east of of Zeerust CBD within the jurisdiction of Ramotshere Moiloa Local Municipality, North West Province.

This Basic Assessment will conform to the National Environmental Management Act 107 of 1998 and to the Environmental Impact Assessment Regulations published in GN R982/2014 - R985/2014 of 8 December 2014.

2 APPROACH TO THE BASIC ASSESSMENT PROCESS

The approach followed by the consultants is based on the specifications for the Basic Assessment Report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.
North West Provincial Department of Rural, Environment and Agricultural Development (DREAD), is the lead authority for this Environmental Impact Assessment (EIA) process and the development needs to be authorised by this Department in accordance with the National Environmental Management Act 107 of 1998 (NEMA) (as amended).

To ensure that all requirements and processes in terms of the Acts are followed the following tasks need to be conducted:
The following has to be submitted to the DREAD:

- ✓ Application form for Authorisation
- ✓ Draft Basic Assessment Report
- ✓ Environmental Management Programme (EMPr)
- ✓ Final Basic Assessment Report

The environmental authority will review the Application and final Basic Assessment Report and the following decisions may be made:

- ✓ Grant authorisation of the activity
- ✓ Refuse the activity
- ✓ Request further information or investigations
- ✓ Refer the application to a scoping process where substantial additional investigations or assessments are required in order to make a decision.

3 PROJECT LOCALITY

The site is located approximately 2km east of of Zeerust CBD within the jurisdiction of Ramotshere Moiloa Local Municipality, North West Province. *Refer to Figures 1 and 2, Site Location Maps.*

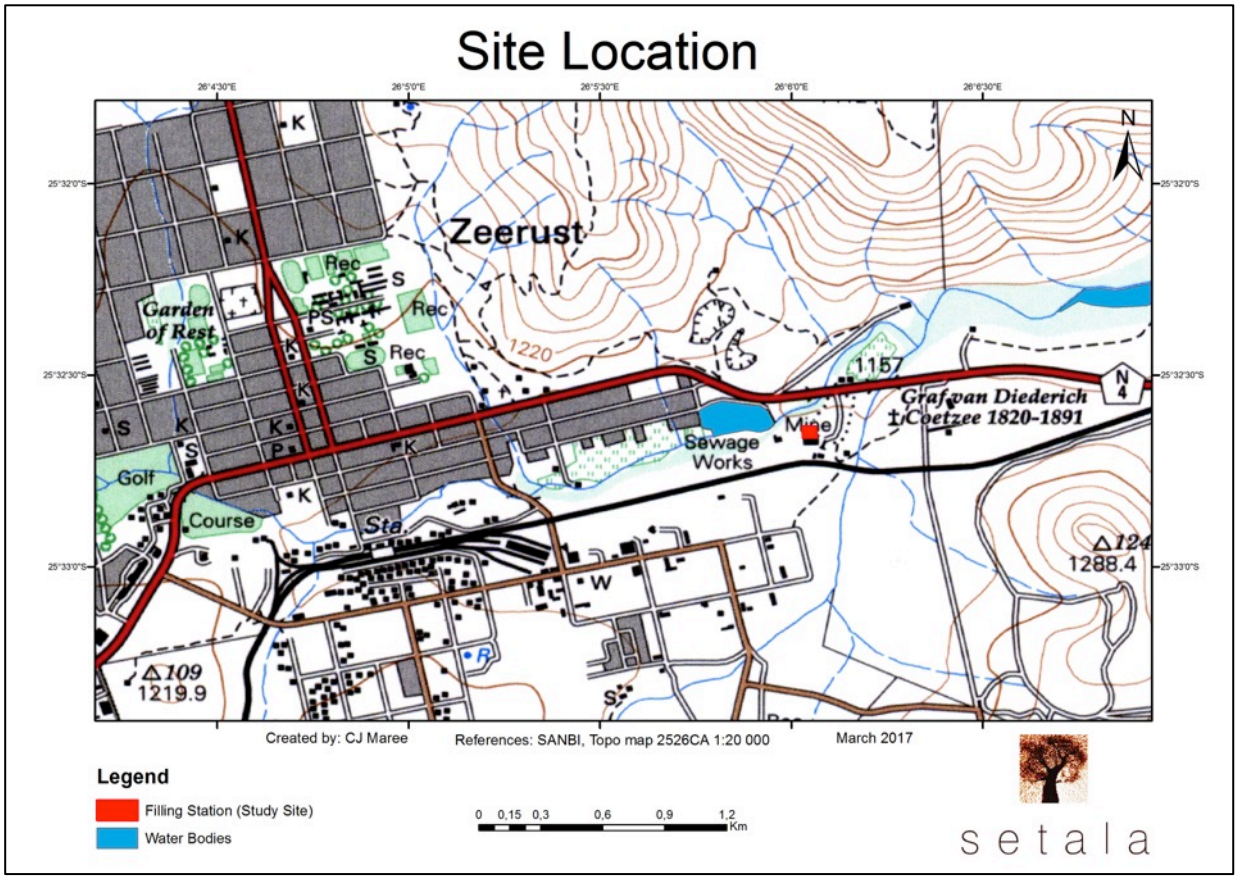

Figure 1: Site Location

Figure 2: Site Location (Google Earth)

The site is situated to the south of the N4 and the Kareespruit, to the west of the Klein-Marico River, to the north of a Rail Way Line on Portion 48 of Hazia 240–JP and to the east of Kloof Street.

4 PROPERTY DESCRIPTION

The proposed filling station will be constructed on **Erf 2** of the proposed **Zeerust Extension 5 development** situated on Portion 24 (a portion of Portion 5) of the farm HAZIA 240 JP near Zeerust town situated in the Ramotshere Moiloa Local Municipality, North West Province. The Surveyor-general 21 digit site (erf/farm/portion) reference number is T0JP00000000024000024.

5 PROJECT DESCRIPTION

This EIA application is for the proposed Hazia Filling Station development and associated infratrsucture which will form part of the proposed Zeerust X 5 development.

An application is made by Natura Professional Planners (Pty) Ltd in terms of the Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013) and specifically in terms of Chapters 5 and 6 of the Ramotshere Moiloa Local Municipality Land Use Management By-law, 2016 for township establishment. Proposed township to be known as **Zeerust Extension 5**. The property is at present zoned as "Special". The township application will be for:

(a) "Business 1" in terms of the Zeerust Town Planning Scheme, 1980, with an Annexure to permit a Shopping Mall including Places of refreshments; Cinema; Shops; Drive Thru Restaurants; Distribution Centre, a Hotel including conference facility; Lounge / Waiting Area; Day Spa; Gym uses compatible or approved by the Local Municipality. **(Erf 1)**
(b) Special" for a Filling station to include a 24/7 Convenience shop with take-aways/Quick service restaurant (400m²) Car wash, an ATM and uses compatible or approved by the Local Municipality. (Erf 2)
(c) "Private Open Space". **(Erf 3)**
(d) "Existing Public Roads".

Refer to Figure 3: Layout Plan Zeerust X 5 and Figure 4: SDP Zeerust X 5

The filling station site (Erf 2) has a coverage of 23% (744 m^2) and FSR of 0.09 (301 m^2). It will include related uses, including a convenience shop. Associated infrastructure will include access roads and civil services (water, sewer, stormwater reticulation and electricity).

The combined capacity of the fuel tanks will not exceed 500m^3 (cubic metres).**Six underground storage tanks (USTs), each having a storage capacity of 23m^3 (equating to a total of 138 m^3) will be installed.**

After approval and proclamation of the township (to be known as Zeerust X5), the land owner will enter into a sales agreement with Munghana Leisure and Tourism (Pty) Ltd to sell off proposed Erf 2 of Zeerust X5 (proposed filling station erf).

This will be a **CORO (Company Owned, Retailer Operated)** site "Company Lease site " where the landlord let the property to the oil company as in this scenario to Total SA (Pty) Ltd. The development of the facility must be done by the landlord/developer himself, provided the development is done to the oil company's standards and the landlord/developer will receive a monthly rental amount payable by Total SA. Total SA will then sub-let the business to a tenant/operator nominated and approved by them.

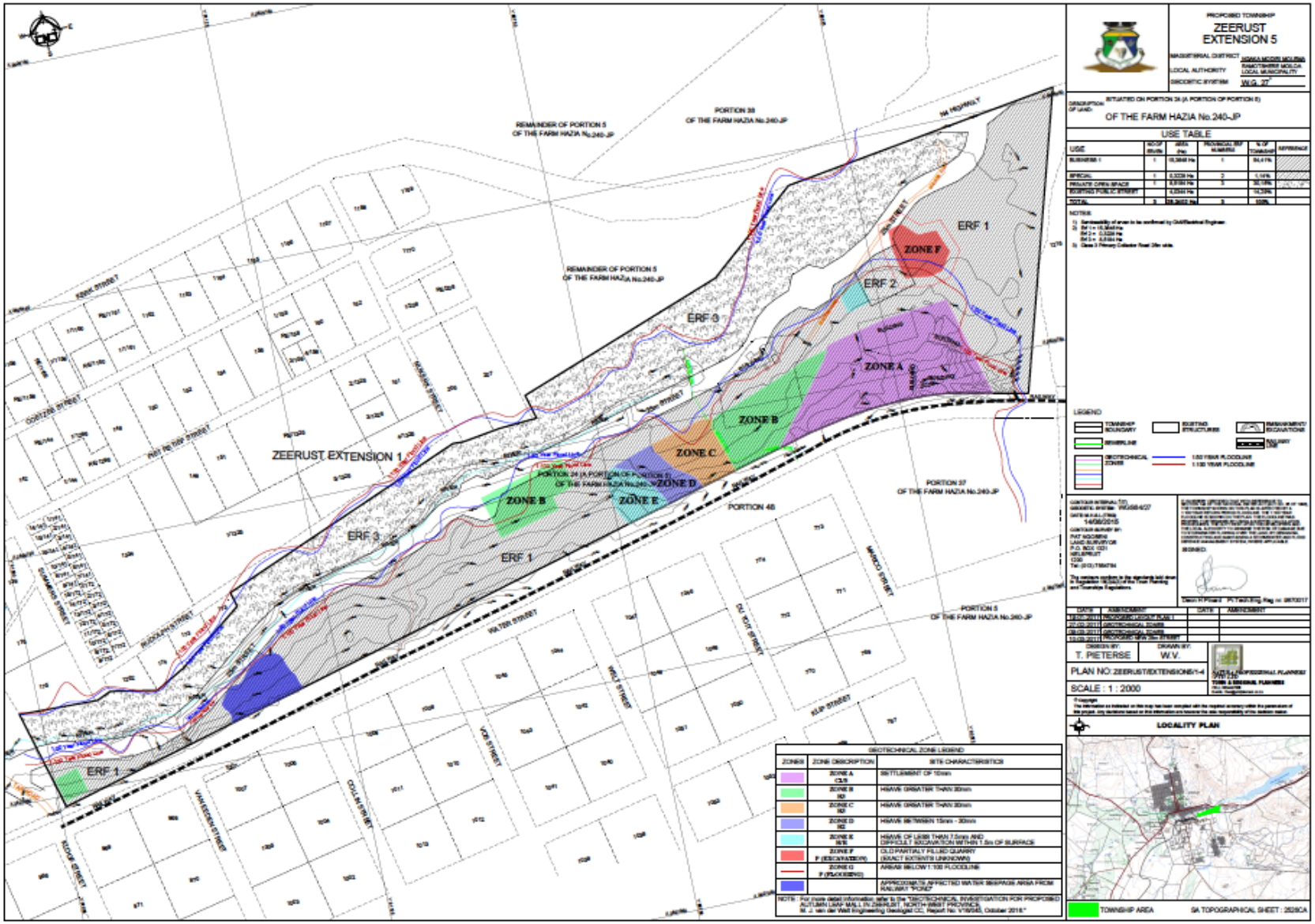

Figure 3: Layout Plan Zeerust X 5

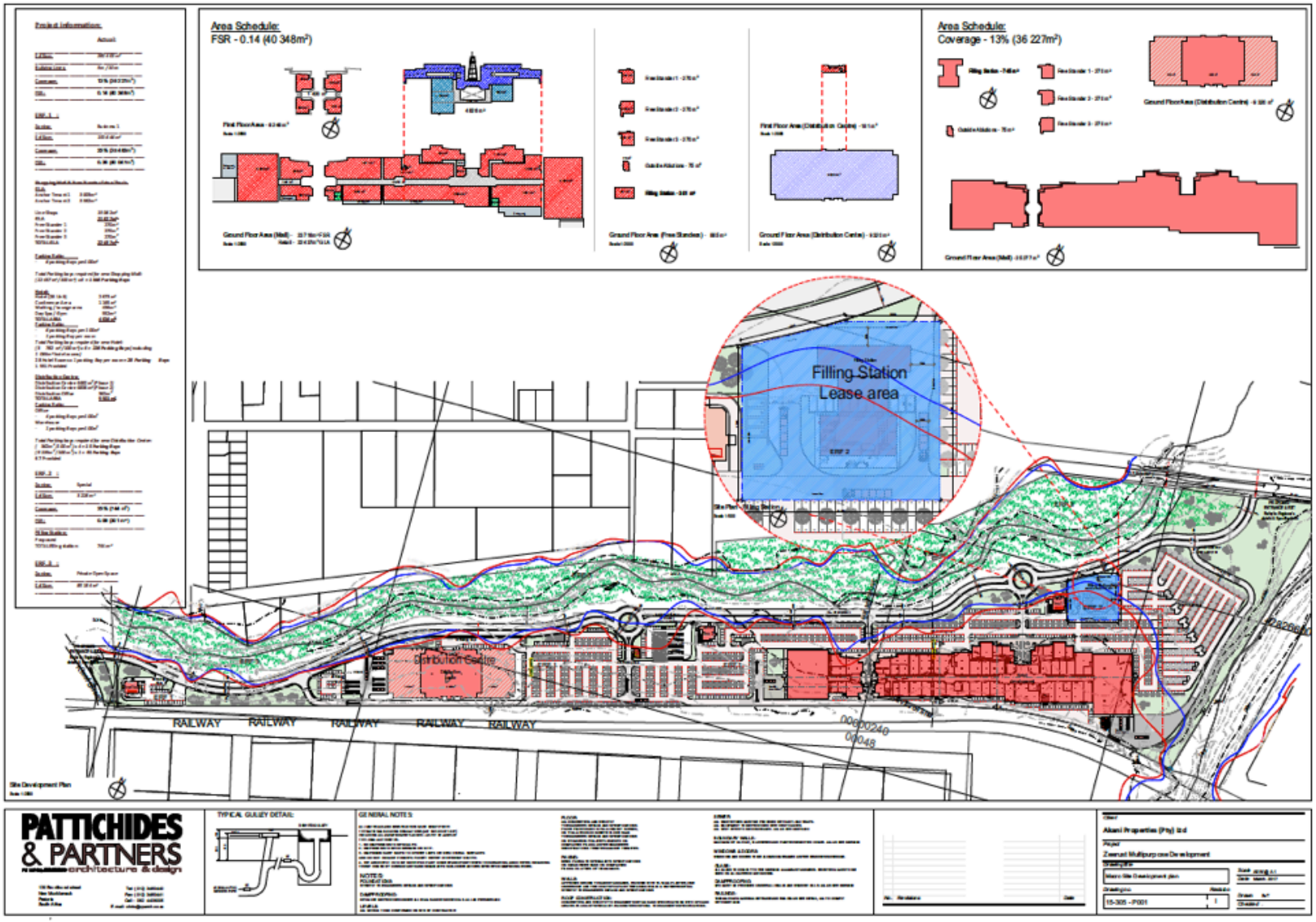

Figure 4: SDP Zeerust X 5

The design of the filling station would be according to the standard Total SA minimum requirements and in accordance with specific conventional construction techniques.

The design will also be in compliance with the minimum development requirements of the local authorities building regulations as well as SANRAL's requirements in regards to advertisement and building lines next to national roads. An added advantage of commercial note is that the wholesaler / oil company (Total SA) could obtain the rights for brand advertising on the national road / N4 information category marketing boards alongside the N4 road.

The size of the proposed site is sufficient to be utilised for the proposed activities with ample of free space for the envisaged activities, vehicular movement and entering and exiting of larger trucks.

The filling station is of sufficient size to operate successfully. Manoeuvring space and parking space is sufficient to prevent vehicles from obstructing each other as well as the entrances and exits.

The proposed filling station and associated facilities will comprise the following:

The following facilities will be available,

- Fuel bay - Providing a 24-hour and courteous service. The pump islands are strategically placed on site to prevent traffic flow problems, and to ensure maximum utilization of all servicing points separately for light and heavy vehicles.
- 24/7 Petrol and diesel categories under one roof:
    - Pumps; 4 x 6 hose, 2 x 2 high speed hose.
    - Underground storage tanks (UST's) consisting of 6 x 23m³, (2 x 23m³ DGO 50 ppm / 500ppm, 4 x 23m³ ULP93/95).
    - Four (4) islands
        - Product – Unleaded 93 & 95 RON, Diesel 50ppm & 500ppm.
        - Separate (1 island) – Diesel 50ppm & 500ppm island at the fuel delivery point to accommodate larger vehicles.
    - Submersible pump units will be used to pump the product through an approved dispenser metering device into a vehicle fuel tank or to a portable container.
    - Erection of a suspended forecourt roof above the dispensers to protect customers and dispensing facilities from the elements.
    - Remote fuel filling points will be installed as close to the UST's as possible, although the location of the filler points is dependent on delivery tanker access.
    - Construction of a concreted forecourt surface.
    - Installation of an oil/water separator connected to the surface drainage from the concreted forecourt and fill containment areas, discharging into the municipal sewer system
    - Storage yard for flammable products (e.g. oils and greases)
    - The tank farm will, at a minimum, include a monitoring well and leak detection system installed around the tank farm
- 24/7 Convenience Shop – Take- a way's / Quick Service Restaurant (QSR) for consumers in the local trading area and or passersby - 400m².
- Parking facility for at least 13 light vehicles separate from the adjacent shopping centre parking facility.
- Staff ablution facilities.
- Ancillary offices.
- Storage area.
- Security -The premises will be well lit at night by providing a high level of illumination in the parking areas and on the walkways to the restrooms in and around the buildings as part of the larger facility.
- Security will entail guard services, armed response and armed escorts service if and when necessary servicing the adjacent shopping centre facility as well.
- Reaction services to unwanted behavior ensuring right of admission and linkage to a centralized South African Police Services.

- State of the art security and camera surveillance will be installed and the cash will be connected to the high security safe.
- Communication services will be readily available in the event of emergencies.
  - Pay phone / Cell phones facilities for private and work related calls.
  - Provide an information display complete with a map of the trading area and descriptions, street names, major routes and places of importance.
- Convenient and functional, ablution only facilities for the vehicle operators will be developed on the proposed site, providing both male and female patrons.
- Restrooms - Sufficient restroom facilities will be provided to minimize the inconvenience to the traveling motorists when either the men or the woman's restrooms are out of service these facilities will also be incorporated to provide supplementary serve shopping centre customers as well.

The size of the proposed site is sufficient to be utilised for the proposed activities with ample of free space for the envisaged activities, vehicular movement and entering and exiting of larger trucks.

The internal layout of the service station area for light vehicles will be in accordance with the following, in addition to more restrictive local conditions and bylaws which may be applicable:

- The width of the access driveways should be between 4 and 8 meters
- The driveways between pumps should be 6 meters wide
- The nearest pumps to the property boundary should be 3.5 meters clear or a distance equal to the building line restriction, whichever the larger
- The pump islands are located behind the ingress point, to allow proper and safe circulation through the forecourt.
- The layout of the forecourt designed to minimize light vehicle traffic conflict with the balance of the site and ensure that vehicles entering the forecourt do not interfere with vehicles queuing at the stop line exiting the site

These above mentioned facilities tend to attract passing motorist because it creates a convenient "one-stop shop" for motorist.

The filling station site is affected by the 1:100 year flood lines of the Kareespruit and Klein Marico River. A section of the filling station development i.e. access, canopy, pumps, parking bays and infrastructure fall within the 1:100 year floodlines. Please note the USTs will be installed outside the 1:100 year floodlines. The preliminary layout of the filling station is indicted in ***Figure 5*** below.

The final design and layout of the facility will be based on the specifications of Total SA. A detailed layout for the facility, in compliance with their own internal specification, as well as relevant industry standards, will be compiled by Total SA.

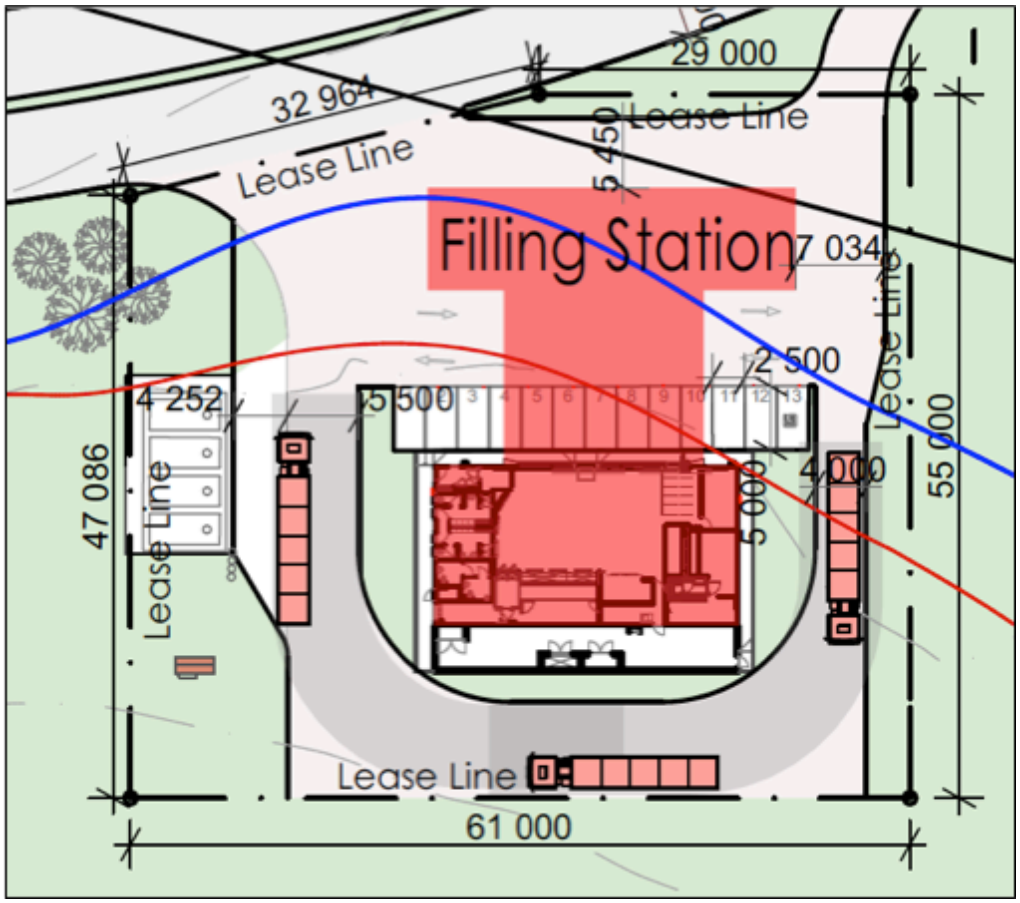

Figure 5: Preliminary Layout

6 TOPOGRAPHY

The topography of the region and study area is comprised of mountains and ridges to the north, east and southeast, with the town of Zeerust and the study area situated as such on the flat valley bottom plains. The Klein Marico Poort Dam lies in the valley within these mountainous areas, to the east of the study area.

The site slopes from west to north east with an average gradient of approximately 1.1%. The gradient of the site promotes effective drainage towards the low point on the north eastern corner of the site.

7 SURROUNDING LAND USES

The study site falls within the urban edge of Zeerust. The surrounding land uses varies around the proposed development site. Access to the site is provided from the N4 and Kloof Street. The site is located between three elements, namely two rivers, the N4 and the Transnet railway. To the north of the site is the wastewater treatment works (WWTW) of Zeerust and a residential area that compromises mostly out of single residential units as well as a few high density residential units. The residential area falls within the middle-income category. The Zeerust dumping site is situated to the north of the site opposite the National Route N4. A guest farm is situated immediately north of the study area, on the opposite side of the National Route N4. The Transnet railway is located immediately south of the development site. Other land-uses than the railway on the land south of the development site can be described as predominately light industrial and vacant stands. Some of the functions of the businesses in this area include:

cash & carry; automotive industries and telecommunications. A Truck Stop is located to the east of the site along the N4.

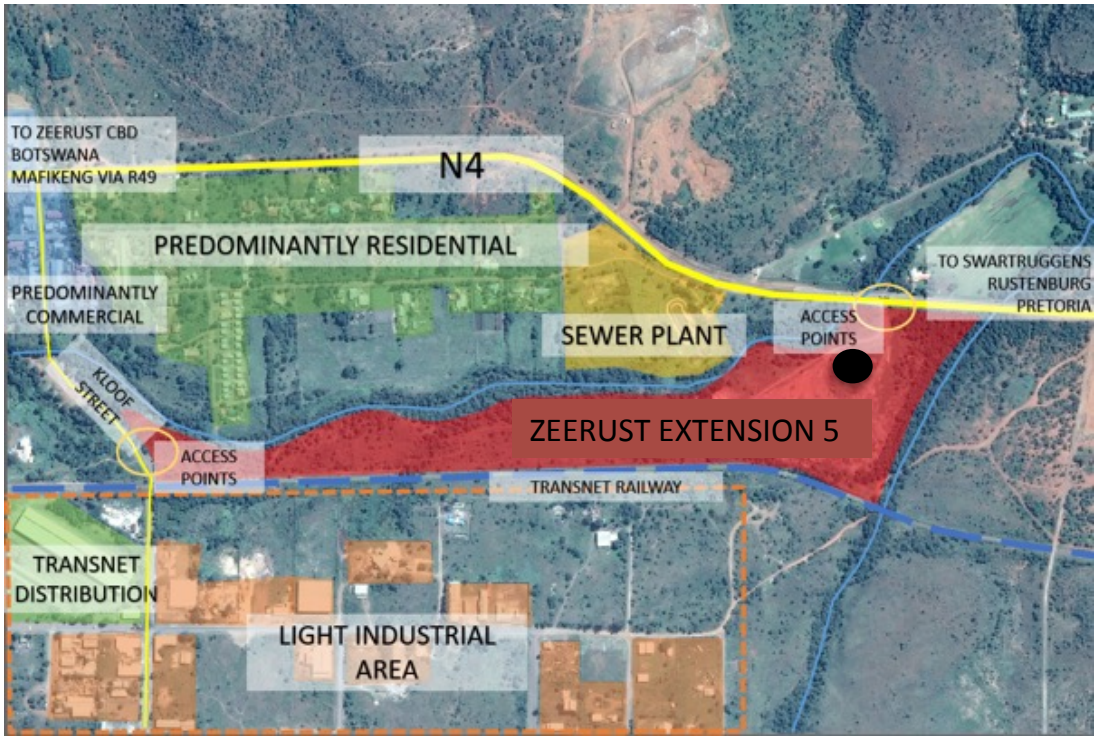

Figure 6: Surrounding Land Uses

The study site itself is situated on an old brickyard property in the extreme eastern edge of the town. This area is less densely urbanised with open bushveld, as well as two watercourses. Numerous large, alien weed tree species are present on the property. Presently the study area is a vacant lot, with no businesses or developments taking place. A number of derelict office buildings, factory buildings and vacant brickyard are on the site, which takes up a fair amount of the surface area of the study site.

8 LEGAL REQUIREMENTS

8.1 National Environmental Management Act

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as amended and the EIA Regulations 2014, an application for environmental authorisation for certain listed activities must be submitted to the relevant authority, the Department of Rural, Environment and Agricultural Development, North West Provincial Government, (DREAD).

A Basic Assessment (BA) process for this proposed project is being undertaken by Setala Environmental. The listed activities for the proposed Hazia Filling Station project are the following:

Table 1: Listed Activities

Listed Activity	Activity/Project Description
GN R983/2014 Activity 14 The development of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	The applicant proposes to develop a filling station and associated infrastructure with a total on site dangerous goods storage capacity of less than 500 m^2. Products (Diesel and Petroleum) will be stored in 6 X 23m^2

	USTs below the service station forecourt. The combined capacity of the tanks will be 138m^2.
GN R983/2014 Activity 19 The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or where such development is related to the development of a port or harbour , in which case activity 26 in Listing Notice 2 of 2014 applies.	To make provision for the excavation or infilling of more than 10 cubic metres of soil within the 1:100 year flood lines on the site. A section of the filling station development i.e. access, canopy, pumps, parking bays and infrastructure fall within the 1:100 year flood lines and will result in the excavation or infilling of soil within the flood lines.Please note the USTs will be installed outside the 1:100 year flood lines.
GN R985/2014 Activity 12 The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. **a. North West** i. World Heritage Sites; core of biosphere reserve; or sites or areas identified in terms of an international convention; ii. A protected area including municipal or provincial nature reserves as contemplated by NEMPAA or other legislation; iii. All Heritage Sites proclaimed in terms of National Heritage Resources Act, 1999 (Act No. 25 of 1999); iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority; v. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or vi. Areas within a watercourse or wetland, or within 100 metrrs from the edge of a watercourse or wetland.	According to the conservation plan of the North-West Province (2009), the area is within a Critical biodiversity area (CBA 1). This includes large areas of the Zeerust town as well. The main reason for the area being a Critical biodiversity area (CBA1) is the importance of the catchment and watercourses of the Marico Rivers in particular for the North-West Province. The watercourses in the region of Zeerust are seen as being under threat and therefore in need of conservation. In addition, the site falls within 100m from the edge of the Kareespruit. The filling station site is 0,3228 ha in extent and will result in the clearance of 300m^2 of indigenous vegetation.

8.2 Applicable Legislation, Policies and/or Guidelines

The following legislation, policies and/or guidelines of any sphere of government are applicable to the application as contemplated in the EIA regulations:

Table 2: Applicable Legislation, Policies and /or Guidelines

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Environmental Management Act (Act No. 107 of 1998) (as amended)	Protection of the environment of the study area and surroundings.	National & Provincial	1998
National Environmental Management: Waste Act (Act 59 of 2008) (as amended)	Protection of the surrounding environment through efficient waste management by the appointed Contractor.	National & Provincial	2008
National Environmental Management: Air Quality Act (Act 39 of 2004)	Protection of the air quality of the study area through dust minimisation and the application of dust suppression measures.	National & Provincial	2004
National Water Act, 1998 (Act No. 36 of 1998)	Protection of water resources and where not possible relevant permits / licenses will be required. A WULA is required for activities within the 1:100 year flood lines.	National & Provincial	1998
National Heritage Resources Act (Act No 25 of 1999)	Protection of heritage resources surrounding the study area and those uncovered during the development phase by reporting to the nearest heritage authority.	National & Provincial	1999
National Environmental Management: Biodiversity Act (Act 10 of 2004)	Protection of biodiversity features and where not possible relevant permits will be required.	National & Provincial	2004
National Road Traffic Act (Act No 93 of 1996)	The contractor will obey traffic laws by driving at minimal speed approved by local authorities.	National & Provincial	1996
Occupational Health and Safety Act (Act No. 85 of 1993)	Protection of workers on site through the provision of Personal Protective Equipment; Training and other health and safety amenities.	National & Provincial	1993
Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (as amended)	Eradication and control of classified invader plant species	National & Provincial	1983
All relevant Provincial regulations and Municipal By-laws	The Contractor will obey and abide by provincial and municipal by-laws which are related to the proposed project.	Provincial & Local	
Hazardous Substances Act (Act 15 of 1973)	To provide for the control of hazardous substances which may cause injury or ill-health to or death of human beings.	National	1973
National Building Regulations and Building Standards Act (Act 103 of 1977)	Contractor will obey and abide by building regulations	National & Provincial	1977
South African National Standards	The South African National	SABS National	

(SANS) 10 of 089: The Petroleum Industry Part 1: Storage and distribution of petroleum products in above-ground bulk installations. Part 2: Electrical and other installations in the distribution and marketing sector. Part 3: The installation of underground storage tanks, pumps/dispensers and pipework at service stations and consumer installations.	Standards (SANS/SABS), applicable to the Petroleum Industry and in particular to the installation of underground storage tanks, pumps/dispensers and pipework at service stations, would be applicable and must be complied with. These standards should be considered as a minimum.		2008 2007 1999
Petroleum Products Act 120 of 1977 as amended - Petroleum Products Site and Retail Licence Regulations 2006	A Site or Retail Licence must be obtained from the Department of Energy.	National	2006

9 FEASIBLE AND REASONABLE ALTERNATIVES

During investigations various alternatives within the study area were investigated. The best options will be determined through the environmental and specialist studies, as well as public opinion.

The following alternatives have been identified and are described as follows:

9.1 Site alternatives

During the planning phases of the Zeerust X 5 development different layout alternatives were considered.

Site Alternative 2
According to the original layout the filling station site was located in the north-eastern corner of the site with direct access from the N4 Highway. ***Refer to Figure 7, Site Alternative 2.*** However, the floodline assessment conducted by Klunene Consulting Civil Engineers indicated that the entire filling station site falls within the 1:100 year flood lines. Site Alternative 2 was not considered a feasible alternative.

Site Alternative 1 (Proposal)
The layout of Zeerust X 5 was amended to take the 1:100 year flood lines into consideration. According to the proposed final layout of Zeerust X 5 only a section of the filling station site falls within the 1:100 year floodlines.
Site Alternative 1 was regarded as the preferred alternative and is the proposal. ***Refer to Figure 8, Site Alternative 1 (proposal).***

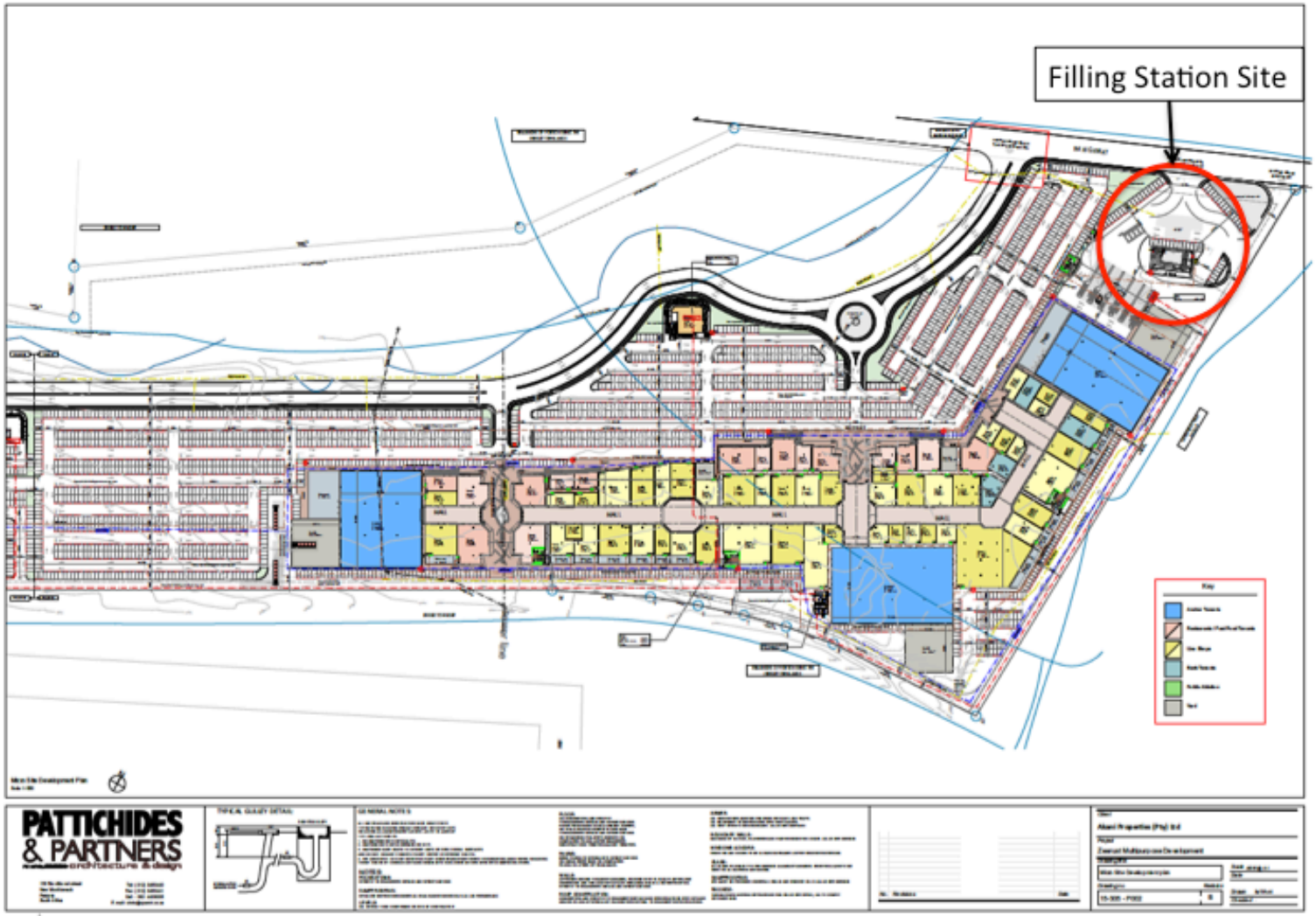

Figure 7: Site Alternative 2

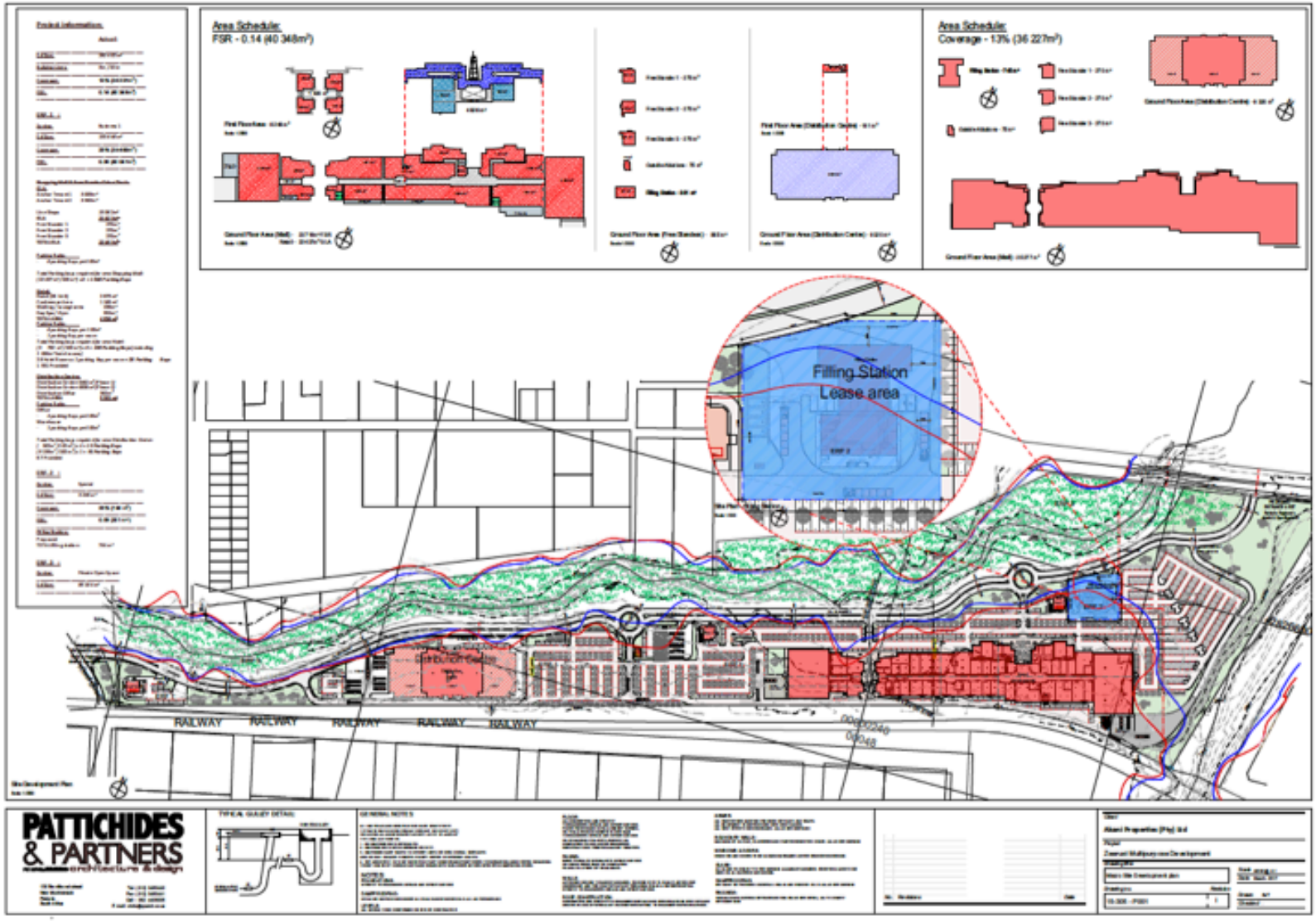

Figure 8: Site Alternative 1 (Proposal)

9.2 Layout Alternatives

No layout alternatives were considered. Refer to Figure 5 Preliminary Layout.

9.3 Technology alternatives

No technology alternatives are being considered for this project as no alternatives which are feasible or reasonable are available. The storage of fuel for dispensing is governed by SANS 10089-3, and the installation of the underground storage tanks and associated fuel handling infrastructure, will need to conform to these standards. This requirement limits the opportunity to implement alternate technology.

9.4 Design alternatives

Design alternative 1 (proposal)
Proposal with sustainable design principles.
Sustainable design principles in terms of services will be implemented where feasibly possible. i.e. Solar panels.

Design alternative 2
Proposal with conventional design principles.
Only conventional design principles in terms of services will be implemented.

Design alternative 1 is the preferred alternative to ensure a sustainable development.

9.5 No-Go Alternative

The no-go alternative involves not developing the site for a filling station and would entail leaving the site in its present state (un-serviced, untransformed stand).

This alternative would result in fewer environmental and social impacts (both positive and negative). The economic feasibility and long term viability of the larger development, would also decrease as there would be less incentive for motorists to leave the N4 to visit the establishment.

The No-Go development alternative could therefore not be considered the responsible way to manage the site.

10 SPECIALIST INPUT

Specialist input was obtained to investigate the impact of the various alternatives that could accomplish the purpose of the project. The specialist input is summarised as follows:

10.1 Geotechnical Investigation

The following information has been extracted from the Engineering Geological Investigation Report undertaken by M. J. van der Walt Engineering Geologist CC . *Refer to Appendix G 4.*

The objectives of the investigation may be summarized as follows:

- To determine the geology and relevant mechanical properties of the soil and rock horizons underlying the site.
- To provide foundation recommendations for the proposed structural development.

- To comment on the excavation characteristics of the materials underlying the site for the installation of services.
- To comment on the potential usage of the materials for use in layer works in paving and roads.
- To comment on site water management aspects particularly pertaining to shallow groundwater or seepage.

Geology

According to the available geological map Zeerust and its surrounds are underlain by sediments (shale and slate that contains andalusite) of the Timeball Hill Formation belonging to the Pretoria Group, Transvaal Supergroup. Diabase of Post Transvaal geological age has intruded the sediments along planes of weakness. A thick diabase sill is present in the vicinity of the site. The bedrock is sequentially overlain by residual and transported soils.

Geotechnical Evaluation

Test Pits 9 and 10 are considered representative of the sub-soil conditions of the filling station site. This area is underlain by a thick layer of potentially "medium" expansive soil and is classified as ***H2*** according to the National Home Builders Registration Council's Standards and Guidelines (NHBRC) of 1999. This indicates that total heave of ***15 to 30mm*** is estimated with differential heave assumed to equal 50% of the estimated total.

Excavation Characteristics

The excavation characteristics of the different soil horizons encountered have been evaluated according to the South African Bureau of Standards standardized excavation classification for earthworks (SABS – 1200D) and earthworks (small works – SABS 1200DA).

The excavation/refusal depths encountered in TP9 & TP10 is provided below in Table 3 but for detailed excavation characteristics refer to the soil profiles in *Appendix B, Geotechnical Report*. It is anticipated that for "soft to intermediate excavation" conventional earth moving equipment would suffice for the excavation of foundation and service trenches. The use of a powerful excavator, pneumatic equipment and/or limited blasting would most probably be required for the excavation of trenches in the areas described/inferred as "hard excavation". It should be borne in mind that hard rock diabase "core stones" and or boulders might be encountered during excavation and depending on their size might require blasting for removal.

Table 3: Summary of Excavation / Refusal depths

TP	**Maximum/Refusal Depth (m)**	**Material Description**	**Inferred Excavation Class**
TP9	1.9 - near refusal.	Very soft rock diabase.	Intermediate to hard.
TP10	2.4 - near refusal.	Very stiff to very soft rock diabase.	Intermediate.

The following foundation recommendations may be considered for the proposed structure/s utilizing the maximum permissible bearing pressure as indicated.

Stiffened Concrete or Cellular Rafts

- Structures may be placed on stiffened concrete or cellular raft foundations at shallow depth designed to accommodate the estimated heave.
- Bearing pressure should not exceed ***50kPa***, but is at the discretion of the design engineer.
- Structures should be articulated at strategic points as determined by a structural engineer with reinforced masonry.
- Ground floor slabs should be reinforced according to the anticipated storage/axle loads and isolated from the main structure.
- A 1,5m wide paved strip must be placed around the entire structure and sloped to avoid accumulation of water near the structure.

- All yard walls, steps etc. should be isolated from the main structure to allow independent movement.
- All wet services should be flexible in design to accommodate movement where entering or leaving structures.
- Storm water should be effectively captured and led well away from all structures.
- No ponding of surface water should be allowed to occur adjacent to foundations both during as well as after construction.
- Trees, especially hydrophilic varieties should not be planted close to foundations or near the line of buried services.
- Trees should in any case not be planted within a radius of twice their full-grown height to structures.

Soil Raft

- Remove the in-situ material to 1,5m beyond perimeter of structures and to a depth of 1,5 times the widest foundation below founding level. Minimum foundation width assumed to be 0,6m.
- Import suitable dump rock and compact with a minimum of 10 passes with a 20t vibrating roller to create a minimum 300mm thick "stable" layer. This would act as a drainage layer and as a base for the soil raft.
- Construct a soil raft with suitable inert ***G6*** material in 150mm layers compacted to 95% Mod AASHTO density at optimum moisture content.
- A Young's modulus of ***60MPa*** should be achieved.
- Structures may be founded on continually reinforced footings at shallow depth within the soil raft utilizing a maximum permissible bearing pressure of ***150kPa*** for a raft thickness of 0,9m below founding level.
- Structures should be articulated at strategic points to cater for any differential movement.
- All layers of brickwork in the plinth should be reinforced with brick force and thereafter every fourth course to at least four reinforced courses above all openings such as doors and windows.
- Ground floor slabs should be reinforced according to the anticipated storage/axle loads and isolated from the main structure.
- For every 300mm thickness of raft the density and stiffness should be confirmed using sand replacement methods and plate bearing tests respectively. The density of the compacted layers should be modified accordingly. Plate bearing tests are specified to confirm that settlements are acceptable for the structures.
- A 1,5m wide paved strip must be placed around the entire structure and sloped to avoid accumulation of water near the structure.
- All yard walls, steps etc. should be isolated from the main structure to allow independent movement.
- Site drainage with service and plumbing precautions as described above.
- Trees, especially hydrophilic varieties should not be planted close to foundations or near the line of buried services.
- Trees should in any case not be planted within a radius of twice their full-grown height to structures.
- The contractor should implement adequate slope protection measures to ensure a safe working environment.

The design of raft foundations (whether soil or concrete) should be done in accordance and under supervision of a civil or structural engineer and the NHBRC recommendations given above should be verified during construction. Strict quality control is necessary during the compaction procedure to ensure that the desired result is achieved. Densities and stiffness of the compacted soils must be controlled with suitable field tests. The design of first floor and upper slabs should take the estimated heave into account.

The underground fuel tanks should be placed on a minimum of 150mm compacted inert material "bedding" and a minimum of 150mm inert backfill material should be placed around the tanks. A proper leakage detection system must be installed to prevent contamination of the surrounding soil, ground water as well as the river located north of the site in the event of a leak. The potential expansive nature of the soils should be borne in mind for the design of the tanks, fuel lines, pipes etc. as swell pressures may develop over time.

The use of a powerful excavator, pneumatic equipment and/or limited blasting would most probably be required for the excavation of trenches and for the installation of the fuel tanks.

10.2 Geohydrological and Contamination Risk Assessment study

The following information has been extracted from the Geohydrological and Contamination Risk Assessment Report undertaken by JHB Kruidenier. *Refer to Appendix G3*

The aim of this study was not to calculate the sustainability of the aquifer or to calculate the possible impact by groundwater abstraction, but to serve as a base line groundwater reference study and contamination risk assessment.

A desk study was performed to gather relevant geological and geohydrological information. A hydro - census followed the desk study to establish information such as water level and borehole depths in existing boreholes in the region of the proposed filling station. The purpose of this survey was to gather relevant geohydrological information to study the groundwater regime. Twelve boreholes could be found in a 1.3 km radius from the proposed filling station site. Valuable information regarding the groundwater regime could be gathered from these boreholes.

A geological walk-over study was done to determine the in-situ geology. One test pit was prepared for double ring inflow meter tests. The aim of this test was to establish percolation rates for the relevant soil zones to facilitate the contamination risk assessment. A geophysical study investigated the geological integrity of the host rock of the site. This data was used to guide the final conclusions of the contamination risk assessment.

No boreholes were drilled during the study on the proposed filling station site. One borehole found during the hydro census is located ideally, on the down gradient side, to be used as ground water monitoring facility. The percolation rate tests, geology - and groundwater occurrence information were utilized to determine the contamination risk for the site.

Environmental Impact Assessment

Potential impacts during construction phase

- Contamination of surface water from site levelling and excavations
- Contamination of surface water if the temporary latrines are not used and workers “go to the bush”.
- Contamination of fuel leaks and oil leaks from construction vehicles.

Potential impacts during construction phase

- Contamination of surface water with hydrocarbons from possible small spills of oil, diesel and petrol spilled on the paved areas.
- Contamination of groundwater with hydrocarbons spilled from storage tank leaks

With mitigation, the significance of these activities is rated as **“Negligible”**.

Groundwater Monitoring Program

It is important to have a monitoring system in place to monitor the potential impacts on the environment such as surface and groundwater quality in the area around the filling station site.

The main focus of a monitoring system must be to monitor possible leakages before the environment is damaged. The systems that are put on site such as the storage tanks and fuel lines must have a monitor system attached. These systems must be able to detect a faulty system rather than detect fuel outside the system in the aquifer. A

double tank system which detects leaking inside the second tank is a better option than detecting leaking fuel outside the system.

The proposed two surface monitoring points (Upstream and Downstream) and borehole H/BH 3 must be used as a groundwater monitoring point. Refer to Figure 8, Appendix G3 for the location of the three monitoring points. A fourth point for surface monitoring can be added. The recommended position for the fourth point is the Bridge at the crossing of the Klein Marico River and the N4.

During the hydrogeological study the following conclusions could be made:

- The water level depth on the proposed development site could not be measured but is estimated to be 10 metres below ground level.
- Groundwater movement in the diabase located below the proposed filling station site is expected to be fairly low.
- According to the Groundwater Protocol document, Version 2, the vulnerability of the Groundwater Aquifer due to the Hydrogeological Conditions at the proposed filling station site can be rated as **Medium risk**.
- The surface material layer that is found on site has a medium capacity to absorb contaminants and a medium capacity to create an effective barrier to contaminants.
- A high reduction of bacteria and viruses will be evident in the unsaturated aquifer if a sanitation leak does happen.
- Nitrates and phosphates will be minimally reduced and chloride will be minimally reduced.
- A minimal reduction of hydrocarbons is expected.
- During the construction phase the potential impacts without mitigation measures are rated as **"Low".** With mitigation measures the significance of the impact is rated as "**Negligible".**
- During the operational phase the significance of the impacts without mitigation measures are rated as **"Moderate**". With mitigation measures the significance of the impact is rated as "**Negligible".**

Recommendations and mitigation measures

The following mitigation measures are recommended in the Construction Phase:

- Construction should preferably take place in the dry season, as surface water runoff is minimal.
- Additional storm water concentration must be contained.
- Latrines should be kept away from sensitive drainage areas. Temporary latrines used during construction must be connected to the bulk sewerage lines if possible. Alternatively portable latrines should be sealed units that can be cleaned by truck and the waste must be taken to a suitable sewage facility for treatment. They should be well maintained and regularly cleaned and sewage should not be allowed to directly access the groundwater. Latrines must be used as a first priority. "Go to the bush" must be prohibited.
- No uncontrolled discharges from the construction camp should be permitted.
- All vehicles shall be properly maintained and serviced so that no oil leaks occur on site.
- Any stockpiled soil and rock should have storm water management measures implemented.
- The large roof structures to be implemented may enhance storm water volumes that need to be managed.
- The storm water canal dumping storm water directly on the site must be re- routed.
- A storm water plan must be available and used during all the phases of construction.
- Vehicles and machines on site must be maintained properly to ensure that oil spillages are kept at a minimum.
- Spill trays must be provided for refueling of plant vehicles.

The following mitigation measures are recommended in the Operational Phase:

- **A groundwater monitoring program or plan to facilitate groundwater monitoring must be implemented.**
- Storm water originating from the filling station surface area must be treated as dirty water.
- Clean water and dirty water systems must be separated.

- Stormwater must be directed away and around the filling station sites.
- Leak detection systems must be implemented in all fuel storage and transmission lines and tanks.
- Air monitoring systems must be implemented around the storage tanks.
- The spillage of fuels, chemicals and or sewerage water must be immediately reported to the assigned Departments stipulated in the water use license document, EMPr and the Environmental Authorization.
- The proposed two surface monitoring points (Upstream and Downstream) and borehole H/BH 3 must be used as a groundwater monitoring point.
- A fourth point for surface monitoring can be added. The recommended position for the fourth point is the Bridge at the crossing of the Klein Marico River and the N4.
- An emergency accidental spillage plan must be in place and workers must be trained to handle such accidents.
- No uncontrolled discharges resulting in pollution of the receiving environment and aquifer shall be permitted.
- Chemical storage areas should be sufficiently contained, and the use of chemicals should be controlled.
- Water seeping into filled levels on site must be prevented.
- Water pumped from any sump or temporary dewatering pit should be pumped into a dirty water system and should not be allowed to enter any clean water system, natural drainage line, or the aquifer.

10.3 Biodiversity Asessment

The following information has been extracted from the Biodiversity Assessment has been conducted by Setala Environmental. *Refer to Appendix G1*

Please Note: The Biodiversity Assessment was conducted for the entire Zeerust X 5 site. Information relevant to the filling station site was extracted from the report.

Terrestrial Ecology

Vegetation
The study area is within the Savanna Biome and the Central Bushveld Bioregion. The vegetation of the study area is representative of Zeerust Thornveld with deciduous, open short thorny woodland in patches. The natural veld, where it occurs, is dominated by Acacia thorn tree species with an herbaceous lower layer of mainly grasses on deep, high base-status and some clay soils on plains and lowlands. The majority of the vegetation of the study area is badly disturbed and degraded. Until recently, the property was an active brick-making and distribution yard.

The Kareespruit (Stream) and the Klein-Marico River flow to the north-west and east respectively of the study area. The vegetation within the riparian zones of the stream and river is that of Acacia – Combretum - Celtis woodland.

Priority species
There are no priority species, including red data species.

Protected trees in the study area
There are no protected trees in the study area.

Fauna
No priority faunal species (which includes red data species) were encountered during field investigations.

Aquatic Ecology

Watercourses in the study area
Two rivers were identified during field investigations. These are the Kareespruit (Stream) and Klein-Marico River flowing to the north-west and east of the site. No other watercourses, including wetlands or farm dams are present

on the study site. The Kareespruit flows into the Klein-Marico River, which in turn flows into the Klein Marico Poort Dam.

Drainage regions

The study area is situated within the primary drainage area (PDA) of A, and the quaternary drainage area (QDA) of A31D. The area is within the Crocodile & Marico West Management Area (WMA 3) and under the jurisdiction of the newly proposed Limpopo Catchment Management Agency (CMA 1).

Present Ecological State (PES) of watercourses in the vicinity of the study area

A summary of the PES values and categories of the watercourses identified are as shown in the table below.

Table 4: PES

Criteria	Identified Watercourses	
	Kareespruit	Klein-Marico
Category:	C	C
Integrity (PES):	Medium	Medium
PES Description	Moderately Modified	Moderately Modified
Recommended Environmental Management Class	C	C

Ecological importance and sensitivity (EIS) of watercourses in the study area

A summary of the EIS values and categories of the watercourses identified are as shown in the table below.

Table 5: EIS

Determinant	Kareespruit	Klein-Marico	Confidence
Overall EIS	C	C	-
Description	Moderate	Moderate	-

Drivers of ecological change

The main drivers of ecological change on the watercourse/s and water ecosystems in the vicinity of study area are:

- Urbanisation;
- Faulty and poor managed WWTW;
- Water quality changes due to upstream impacts; and
- Over-utilisation of natural resources.

The two watercourses in the vicinity of the study area are important in terms of water supply for irrigation and general human consumption. The water from both these watercourses in the vicinity of the study area supply water to the important Klein-Marico Poort Dam.

Sensitivity analyses

The ecological sensitivity of the study area is determined by combining the sensitivity analyses of both the floral and faunal components. The highest calculated sensitivity unit of the two categories is taken to represent the sensitivity of that ecological unit.

Ecological sensitivity analysis

Table 6:

Ecological community	Floristic sensitivity	Faunal sensitivity	Ecological sensitivity	Development Go-ahead
Thornveld	Medium	Medium	Medium	Go-But
Watercourses	Medium/High	Medium/High	Medium/High	Go-But

Fatal flaws

There are no fatal flaws. However, development directly within the Kareespruit or Klein-Marico would constitute a fatal flaw.

Priority areas

The study site is not situated within any priority areas. Priority areas include protected areas, important bird areas (IBA), wetlands and National protected areas expansion strategy (NPAES) focus areas.

North-West Province Biodiversity Conservation Plan

According to the conservation plan of the North-West Province (2009), the area is within a Critical biodiversity area (CBA 1). This includes large areas of the Zeerust town as well.

The main reason for the area being a CBA1 area is the importance of the catchment and watercourses of the Marico Rivers in particular for the North-West Province. The watercourses in the region of Zeerust are seen as being under threat and therefore in need of conservation.

Identified sensitive areas

The sensitive areas identified during field investigations are the Kareespruit (Stream) and the Klein-Marico River flowing to the north-west and east of the site. As well as their associated riparian zones. The riparian zone needs to be viewed as being a part of the watercourse ecosystem. There are no other sensitive areas or habitats identified such as rocky outcrops (koppies) or areas of protected trees, etc.

There are no natural habitats or areas in a pristine condition. The watercourses, like all watercourses encountered, should be approached as sensitive. These areas were thus demarcated and rated as having a sensitivity rating of High. These areas should ideally be viewed during project planning and development as 'No-Go' zones. The sensitivity map is shown below.

Figure 9: Sensitivity map

Mitigating measures

Mitigating measures have been recommended and need to be implemented to validate the findings and sensitivity demarcations of the report.

The main mitigating measures put forward are:

- Any temporary storage or accommodation facilities to be setup during construction to be within existing built-up or disturbed areas only.
- No temporary facilities or portable toilets to be setup within 50m of any watercourses and riparian zones.
- Avoid impeding or diverting waterflow during construction phase.
- Do not develop within the watercourse or riparian zone.
- Do not remove any indigenous trees from the riparian zone.
- Ensure a proper Stormwater Management Plan is compiled and implemented.

10.4 Heritage Impact Assessment

The following information has been extracted from the Heritage Impact Assessment conducted by Integrated Specialist Services *Refer to Appendix G2a*

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon.

- A Phase I Heritage Impact Assessment (HIA) study was done and no heritage resources as outlined in Section 3 of the National Heritage Resources Act 25 of 1999 were found in the project area.

The report makes the following observations:

- Most sections of the project area are very accessible and the field survey was effective enough to cover significant sections of the project receiving environs. However, some portions of the proposed development site had limited access because of thick vegetation cover.
- The project area is predominantly industrial, commercial agricultural.
- Large sections of the proposed development site are severely degraded from existing developments such as clearing for brick moulding infrastructure, access roads, railway line, power lines and other industrial activities.

Recommendations/Mitigation

Should construction work begin for this project:

- The construction teams should be inducted on the significance of archaeological resources that may be encountered during subsurface construction work before they work on the area in order to ensure appropriate treatment and course of action is afforded to any chance finds.
- If archaeological materials are uncovered, work should cease immediately and the SAHRA be notified and activity should not resume until appropriate management provisions are in place.
- If any evidence of archaeological sites or remains (eg, remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked human burials, or other categories of heritage resources are found during the proposed activities, SAHRA APM Unit (Philip Hine, 021 462 4502) must be alerted immediately, and a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological significance, a Phase 2 rescue operation might be necessary.

This report concludes that the impacts of the proposed development on the cultural and environmental values are not significant.

10.5 Paleontological Impact Assessment

The following information has been extracted from the Paleontological Impact Assessment (PIA) conducted by Dr. H. Fourie. *Refer to Appendix G2b*

The report makes the following observations:

- The development is taking place on the Time Ball Hill Formation of the Pretoria Group, Transvaal Supergroup and the intrusive diabase.
- Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of Karoo Supergroup strata the palaeontological sensitivity can generally be LOW to VERY HIGH, and here locally **HIGH** for the Pretoria Group including the Time Ball Hill Formation (SG 2.2 SAHRA APMHOB, 2012).

Recommendations:

- The impact of the development on fossil heritage is **HIGH** and therefore a field survey or further mitigation or conservation measures may be necessary for this development (according to SAHRA protocol) if a fossil is found.
- A Phase 2 Palaeontological Impact Assessment and or mitigation may be recommended. The overburden and inter-burden must always be surveyed for fossils. Special care must be taken during the digging, drilling, blasting and excavating of foundations, trenches, channels and footings and removal of overburden not to intrude fossiliferous layers.

10.6 Civil Services

The following information has been extracted from the ***Outline Scheme Report compiled by Klunene*** . *Refer to Appendix G5.*

Bulk Services

Zeerust is a well-established town with existing municipal services for water, sewer, roads and stormwater.

Water Reticulation

From information obtained from the Ramotshere Moiloa Local Municipality there is an existing water network close to the site. There are 3 reservoirs that service the town which are fed by boreholes and to date there has never been any shortages from this water source. The Hospital and Smook Street Reservoirs has a capacity of 950 KL and 5000 KL respectively and service the northern part of Zeerust. The Kop Street reservoir has a capacity of 7000 KL and services the southern part of Zeerust.

This new development will tie in to the Kop Street reservoir water network. This reservoir is located approximately 3.7km south west of the site and is roughly 65m higher than the site which means that there is a static head of roughly 6 Bar. Due to the existing draw offs from this reservoir it is expected that the pressure will drop to just above 3 Bar, which will be sufficient to service the proposed development. An onsite reservoir of 700m³ will be needed to store the 24hr peak flow in case of emergencies for the township.

There is a 150mm Ø water main running along Klip Street to the south of the site which then decreases to a 75mm Ø water main from Collin Street onwards. This 150mm Ø water main will have to be extended up Kloof Street. ***See Annexure A: Services Drawing KL16-019-001, Appendix G5.***

Sewer Reticulation
The Zeerust Waste Water Treatment Plant (WWTP) is just to the north of the proposed development. A 450 mm HDPE sewer line bisects the site from south to north, crossing the Karee River by means of a steel frame bridge into the sewer treatment plant.

At 70% percent of full capacity this sewer line can handle up to 285.9 l/s and estimated flows from existing infrastructure is roughly 116.9 l/s. There is enough capacity in this sewer line should the WWTP be upgraded and operating functionally.

This Sewer Treatment Plant is currently running at 184m³/h but is only 15% efficient due to maintenance constraints. Ngaka Modiri Molema District Municipality is to upgrade the plant from a 3.5ML to a 17 ML Treatment plan, and are at Tender stage. Once the treatment plant is upgraded it will have sufficient capacity to support the proposed development.

As the upgrades to the WWTP doesn't have a specified date, it is proposed that Zeerust X 5 development installs an onsite sewer package plant until such upgrades have been completed. Please note the onsite WWTW will not be installed on the filling station site.

Roads
There is a fully functional road network servicing the area accesses required from the N4 and Kloof street to the site. The N4 is currently being upgraded, and the upgrades through town should start in the near future.

Stormwater
There are functional stormwater systems around the site. As the site is situated between the Karee and Klein-Marico rivers it is recommended to use Sustainable Urban Drainage Systems (SUDS) to manage stormwater runoff generated from the new development before being discharged into the natural water bodies.

A Stormwater Management Report will be submitted to council before any construction starts. Extraneous stormwater from the south will be accommodated over the site.

Internal Services

The design of the township services for the proposed township will be based on the principles contained in the Guidelines for the Provision of Engineering Services in Residential Townships published by the department of Community Development and the Councils requirements for engineering services.

The outline scheme is in accordance with the above standards and with officials from the Ramotshere Moiloa Local Municipality.

Water Reticulation
There is an existing 150mm Ø water main to the south west of the site in Klip Street which, should have sufficient supply for this application due to the fact that the area has not yet reached its full potential. A ring feed is proposed through the township from where Erf 2 can obtain a water connection.

The anticipated water demand Erf 2 (Filling Station):

Total area = 744²
At 1300l/d per 100m²
744/100 x 1300 = 9.672kl/d or 0.112 l/s

Total demand = 0.112 l/s
Applying a peak of 4

Total peak flow = 0.448 l/s

Adding in Fire Flow of 25 l/s
The total peak fire flow =25.448l/s

A 110mm Ø water main will be sufficient to service this proposed development.

The peak fire flow velocity is below the maximum of 3.5m/s specified therefore a 100mm Ø (ID) has sufficient capacity to service the proposed filling station.

As there is sufficient flow in the existing network an onsite reservoir for the township will need to be erected and adequate firefighting points provided as per the Fire Consultants comments.

All water services will be designed to Local Authority specifications.

Sewer Reticulation
There is an existing 450mm Ø HDPE sewer line that bisects the site from south to north to where it discharges into the Zeerust Waste Water Treatment Plant just north of the site. This plant is in the process of being upgraded.

The anticipated sewer discharge Erf 2 (Filling Station):

Total area = 744²
At 1000l/d per 100m²
744/100 x 1000 = 7.440kl/d or 0.086 l/s

Total demand = 0.086 l/s
Applying a peak of 2.3
Total peak flow = 0.198 l/s

Internal reticulation on the site will be required. The development connection will be a 160mm Ø PVC-U sewer pipe to connect to the existing 450mm Ø HDPE existing sewer line bisecting the property if the WWTP has been upgraded. Alternatively, it will discharge into an onsite Sewer Package Plant located in the larger Autumn Leaf Mall Development.

All sewer services will be designed to Local Authority specifications.

Township Roads
It is envisaged to construct a double carriage link road from the N4 through the site to link up with Kloof Street which will fulfil the standards of a Class 3 (minor arterial) as a public road, which will reduce traffic congestions through the main road (Church Street) of town. Erf 2 (filling station) will have direct access to this road for traffic ingress and egress.

This will be provided at the time of final designs in accordance with the TIA and to Local and National Authority Specifications.

Township Stormwater (Filling Station)
Areas in close proximity to fuel dispensing equipment carry a high environmental risk associated with intensive fuelling activity and the potential for minor spills to accumulate. Likely pollutants within fuel dispensing areas (FDA) can include fine and coarse sediment, surfactants/detergents, oils, grease, petrol and diesel fuels, heavy metals plus other motor vehicle liquid consumables such as glycols from radiator antifreeze, hydraulic fluids and general litter. The following design guidelines should be followed:

Drainage Separation Options

Drainage separation options may include grading, bunding, kerbing and/or channeling. The ground surfaces within the FDA and the Tanker Delivery Standing Area will be connected to an oil separator/grease trap, before discharging into a closed sewage treatment plant like Ballam-Waterslot's "GEM sewage treatment plant or similar. This system consists of four tanks where the fourth tank is a containment tank fitted with pumps for irrigation purposes. Separation is required to assist in maintaining the spill capacity of the containment vessel.

Approved Surface Materials

All ground surfaces within the FDA shall be constructed of concrete with all gaps and/or cracks filled so that the impervious barrier and integrity is maintained. Asphalt is not considered a suitable equivalent as it can react with hydrocarbons.

Delineation of FDA

The FDA shall be delineated by painted line-work on the ground. Other methods of delineating the FDA may be used eg. roll-over bunds, different colour concretes, etc.

Spillage containment of FDA

The area shall be graded to a suitable underground containment vessel (i.e. sump/tank) compatible with petroleum products and other likely chemicals. The tank shall have no connections to stormwater or sewer. It is proposed to install a gate valve before the separator with and overflow manhole. This valve should be closed during emergency spills to force the spill to overflow into the containment vessel. This valve must be a quick shut type like a ball valve or similar and be well maintained. It should be clearly marked and visible. Staff must be trained to immediately close this valve in the event of spillage.

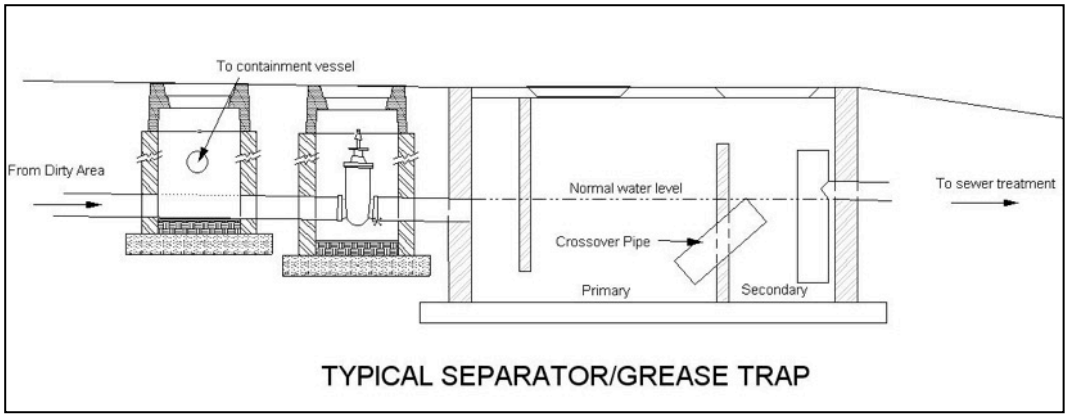

Figure A: Sections of Typical Separator/Grease trap

The tank shall have no connections to stormwater or sewer. The containment vessel shall be constructed of precast concrete with a minimum certified design life of 50 years. All internal concrete surfaces that may be exposed to contact with petroleum hydrocarbons shall be coated with an epoxy resin, to a minimum dry film thickness of 200 microns, applied in accordance with the supplier's recommendations.

Joints shall be made with epoxy or rubber ring seals. Epoxy joints shall be used in accordance with supplier's recommendations. For joints using a rubber ring seal, the rubber type shall be NBR (nitrile). Material requirements for pipe joints seals used in water and wastewater applications with the exception of natural rubber and polyisoprene compounds. The ring shall be water tight to 90kPa internal pressure.

The underground containment vessel shall maintain adequate capacity to contain a volume equivalent to at least the volume of the largest tanker compartment likely to be delivering fuel to the site plus a nominal allowance for windblown rain.

Windblown rain allowance in m³ (V_r) should be calculated using the following equation : $V_r = 0.005 \times 3 \times P_o$, where P_o is the total length of the open perimeter of the canopy in meters.

Canopy Overhang

The roof or canopy shall overhang by a horizontal distance of ¼ of the roof height out from the vertical above the boundary of the demarcated FDA.

Canopy Stormwater - Disposal Options

Preference is for stormwater from roofed areas to be collected in tanks for non-potable use (eg. toilet flushing or garden watering). Alternatively, it may be diverted directly to on-site stormwater infrastructure.

Bulk Fuel Transfer – Under-Canopy Option

Bulk fuel transfers may be carried out under the canopy area within a defined Tanker Delivery Standing Area graded and drained to the underground containment vessel.

Alternatively, Tanker Delivery Standing Areas outside of the canopy will require automatically divert run-off to the underground containment vessel during bulk fuel transfers. At all other times, drainage shall be directed to on-site stormwater infrastructure for uncovered areas.

Clean water roads and paving

- Minor Storm

It is proposed that the stormwater be managed by means of permeable paving, and allow this attenuated water to re-charge the natural ground water. This analysis and design will have to be submitted for approval during SDP stage.

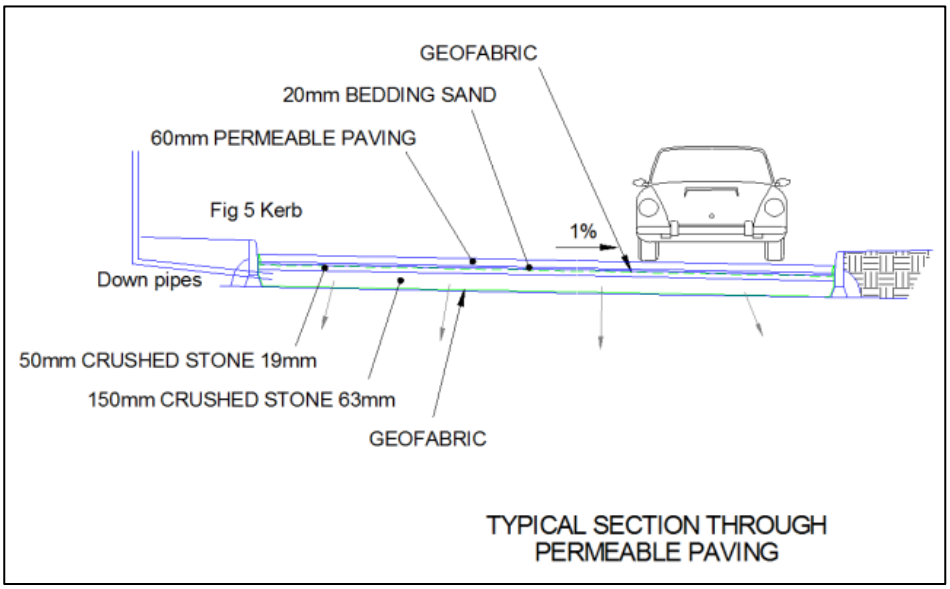

Figure B: Typical section through Permeable Paving

- Major Storm

The site drains towards the north, north-east towards the natural drainage valley. This river connects to the Klein-maricorivier to the east of the site. Sufficient kerb openings and stormwater shoot needs to be constructed on the inter road to accommodate the major storm flows.

- Watercourse / Buffer encroachment mitigation

Stormwater shoots or outlet structures needs to be built with energy dissipaters to eliminate concentrated discharge points.

Further the encroachment into the watercourse is insignificant as opposed to the conservation of the watercourse by allowing the run-off to enter at this point.

The outlet will be supplied with energy dissipaters and Reno Mattress to minimise the erosion at the discharge.

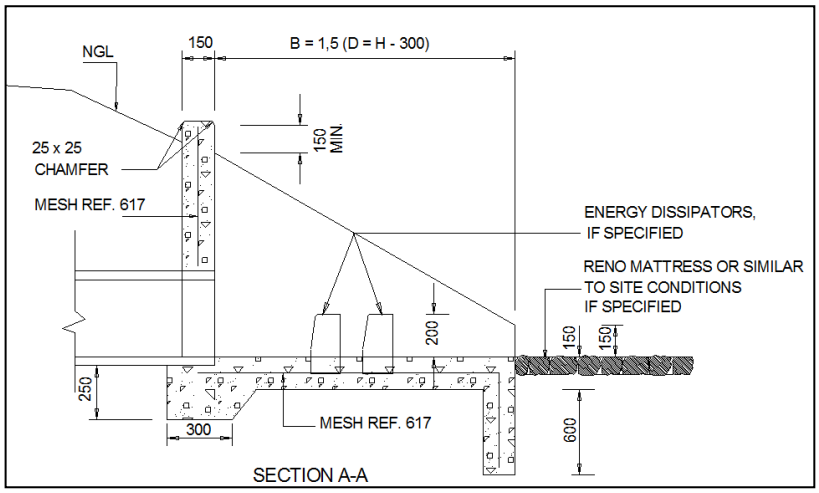

Figure C: Stormwater dissipating structure

Conclusions

The proposed development can be adequately serviced from the existing municipal infrastructure. Upgrades will have to be done to the water and roads network to the developers account. Sewer reticulation will only be handled on site prior if the upgrades of the Waste water treatment plant is not yet done.

All final designs for water, sewer, stormwater and roads will be submitted to council before any construction commences.

10.7 Electrical Bulk Services Report

The following information has been extracted from the ***Electrical Bulk Services Report compiled by Consolidated Power Engineering.*** *Refer to Appendix G6.*

Power Requirement based on floor area

The expected electrical power requirement for the Filling Station is 150kVA.

Electrical Supply Authority

Zeerust Council is the licensed electricity supply authority in the area.

Existing supply
The site already have an existing Council supply of 100kVA, with the point of supply situated under the township main overhead Medium Voltage ring network, as a pole transformer. This line cross the site, towards the main road.

As a stand alone development the Filling Station may utilize this connection, and a moderate upgrade to 150kVA may be applied for via normal application process to the Council..

Bulk Supply Contributions
The expected bulk supply contributions that Council will levy in terms of their policy, is not known at this stage but it is requested in the comments section of the Electrical report.

Availability of Power and Method of electrical connection
Two options are available to provide power to the Filling Station:-

Filling Station supply Option 1:-
CPE was informed by Council that the Town's main electrical supply, Zeerust Municipal 88/22/11kV Substation, is in the process of being upgraded, with an additional 20MVA transformer .

This main substation is approxamitely 2km away (in MV cable length) from the site, and a dedicated supply, preferably underground via 2xMV cables, may be installed to supply 3850 kVA at 11kV, for all phases of the Multipurpose Development as indicated in this report, as well as 150kVA for the Filling Station.

The proposed Multipurpose Development on a portion of the same property, need a 4000kVA bulk connection, which rating include capacity for a new connection to the Filling Station.

The single bulk connection made available by Council can be configured to provide for a Council metered electrical connection to the Multipurpose Development on an individual subdivided erf, and an individual metered electrical connection direct from this bulk Council connection to the proposed Filling Station.

Filling Station Supply Option 2:-
As an alternative for a separated connection, normal application procedure can be submitted to Council to apply for the existing 100kVA existing connection on the site, to be re-located as a supply to the Filling Station, and the same application procedure need to be followed to arrange for a moderate upgrade to 150kVA

Conclusion
Council already confirmed the availability of the bulk 4000kVA connection, and that the supply can be made available as from January/February of 2017.

10.8 Traffic Impact Study

The following information has been extracted from the Traffic Impact Study compiled by EDS. *Refer to Appendix G7.* The purpose of this study was to investigate the traffic flow conditions at the key intersections within the study area, to estimate the expected trip generation of the proposed development whilst taking cognisance of the type of development, to determine the anticipated traffic impact on the surrounding road network and determine whether it is necessary to implement any road and/or intersections improvements to mitigate the anticipated traffic impact.

Parking
It is recommended that on-site parking be provided in accordance with the requirements of *Zeerust Town Planning Scheme, 1980.*

Road Network

With reference to **Figure 10**, below, it can be seen that the road link is proposed as part of proposed Autumn Leaf Mall, to link the N4 Platinum Highway to Kloof Street. This road will form the northern boundary of the proposed filling station site and direct site access will therefore be taken off this new proposed link road.

The proposed road link is a public road, meant to benefit the surrounding area and not serve only the proposed Autumn Leaf Mall. It is estimated that the travel time along the newly proposed road link between Kloof Street and N4 Highway Platinum Highway would be approximately 2 minutes 10 seconds based upon an average speed of 40km/hr.

It is recommended that the proposed road link be constructed to the appropriate design standards of the local municipality.

It is further recommended that the local municipality updates their road network planning in Zeerust in general.

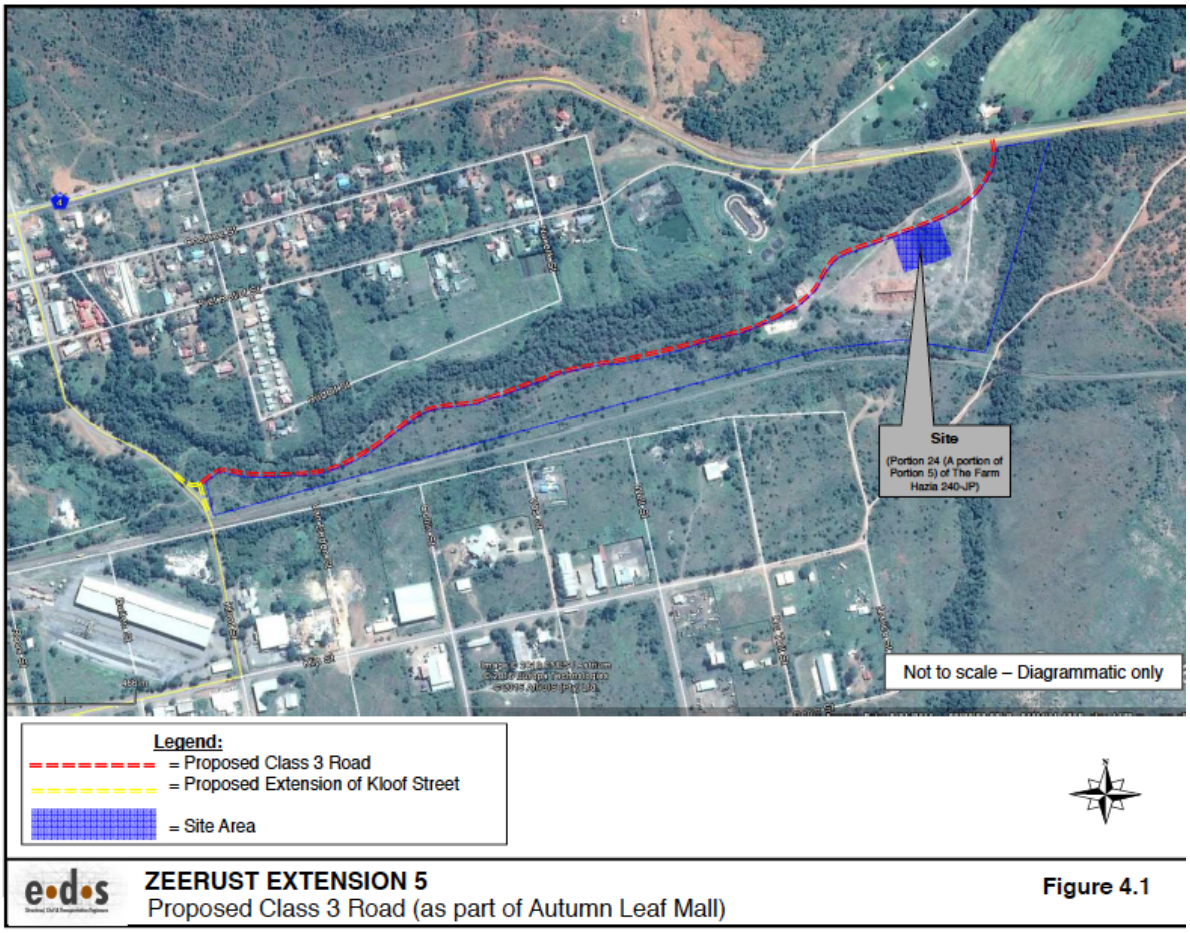

Figure 10: Proposed Class 3 Road

Site Access

The proposed filling station site will be accessible directly from the proposed road link adjacent to the site.

The site will comprise a left-in, left-out type of access and will not provide through fare into the proposed shopping centre site unless approved by the municipality.

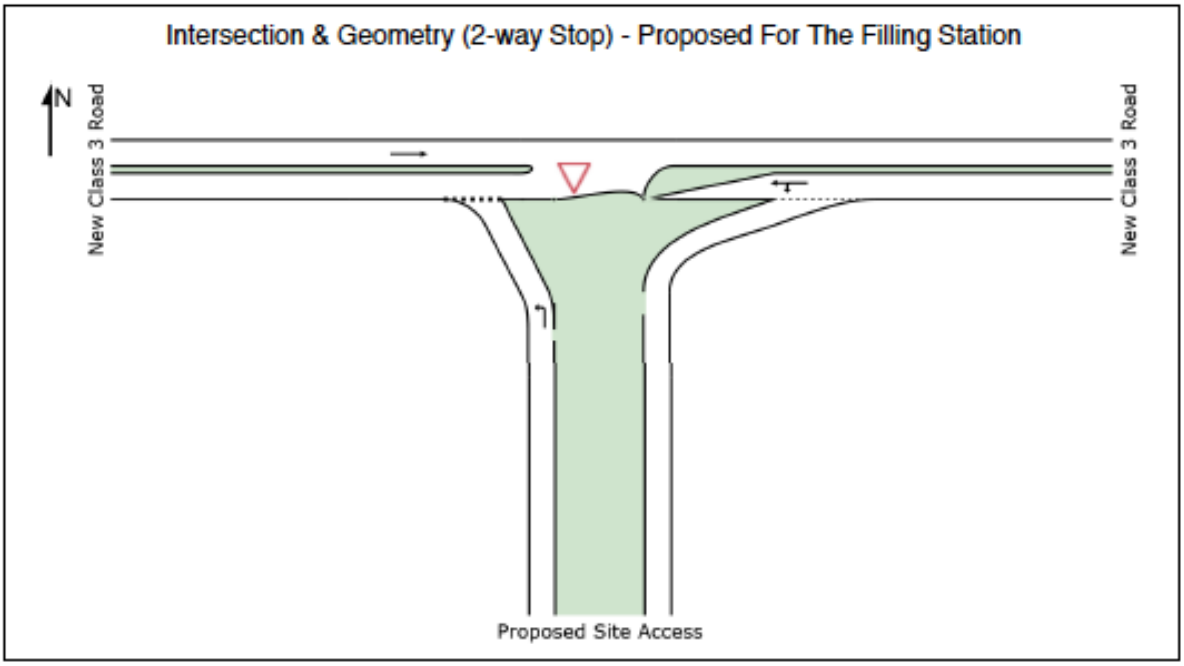

Figure 11: Proposed Site Access

Traffic Diversion & Route Choice Probabilities

It is expected that the background traffic patterns could change as a result of the proposed new road link, connecting the N4 Highway Platinum and Kloof Street.

It is expected that the proposed future road link will automatically attract some of the background through traffic, resulting in a traffic diversion.

Trip Generation

The *South African Trip Generation Rates 2nd Edition* document recommends the use of an attraction / interception rate of 4% of the traffic traveling past the site during both the morning and afternoon peak hour. The document indicates that 16% of the trips attracted should be considered as new (or primary) trips on the road network. The trip generation rates include trips to and from the convenience store.

The percentages above were applied to the background traffic travelling along the N4 Platinum Highway (existing road nearest to the site) in the vicinity of the site, to obtain the estimated filling station trip generation. This can only be achieved if the facility is visible from the N4.

The proposed land use is expected to intercept or attract a total of 14 and peak hour vehicular trips (total in plus out) during the respective morning and afternoon peak hours. It is assumed that 16% of these trips would be new or primary trips and 84% will be the passer-by trips travelling along the N4 Platinum Highway in the vicinity of the site.
Note: This is the filling station trips only – shopping centre trips not included.

Trip Distribution & Assignment

Assumptions on the expected trip distribution and assignment were based on the type of the development proposed, location of its access relative to the surrounding roads network (existing and proposed), anticipated origin and destination of the trips as well as the existing traffic volumes and patterns in the area. Figures 5.1 and 5.2, Annexure G7 depict summary of the expected development trip distribution and assignment.

Traffic Demand

The total future traffic demand was obtained by adding the anticipated development to the existing background traffic (see Figure 6.1, Annexure G7).

Traffic Impact and Capacity Analysis

The expected traffic impact of the proposed filling station at the intersections was determined using Sidra Intersection 7, a traffic engineering software package. The following intersections were analysed:

- N4 Platinum Highway / New Link Road
- New Link Road / Proposed Site Access

The critical peak hour analyses were considered for the following scenario:

- Existing 2017 background peak hour traffic flows with development – as per Figure 6.1, Appendix G7

Detailed results of the Sidra Intersection Capacity Analysis are appended in Annexure C, Appendix G7.

Note: The analysis assumes the new link road (proposed for the shopping centre) in place.

Capacity Analysis

Given the type of development proposed, the anticipated future traffic demand, the expected peak hour trip generations and capacity analyses, the development traffic impact may be described as follow:

- ✓ *N4 Platinum Highway / New Link Road:* - When the anticipated filling station traffic is added to the future background redistributed traffic, capacity analysis indicates that the intersection will operate acceptable during the peak periods. *Figure 8.1, Appendix G7* depicts the proposed geometry of the analysed intersection.
- ✓ *New Link Road / Proposed Site Access:* - Results of the capacity analysis indicate that the intersection will operate acceptable with the total future traffic demand. *Figure 8.2, Appendix G7* depicts the proposed geometry of the analysed intersection.

Annual Daily Traffic (ADT) estimations

The anticipated annual daily traffic was estimated for the purpose of the feasibility study required in support of the proposed filling station.

The available traffic data including the following was used to determine the estimated ADT`s along the N4 Route near its intersection with Kloof Street and along the newly proposed road link:

- CTO Counts (ADT`s and peak hour volumes) at the permeant stations, nearest to the site
- Origin and destination (number plate) surveys undertaken as part of this study
- Intersections traffic counts undertaken as part of this study
- ITE Trip Generation Manual

The estimated ADT`s determined, are made up of the following components;

- Through Traffic
  - o Along N4 Route through Zeerust CBD
  - o Along N4 Route east/west and Kloof Street north/south

- Local Traffic
  - o Mall Traffic - As per anticipated shopping centre trip generation, assignment and distribution
  - o Non Mall Traffic – Anticipated to be negligible due to the location of the shopping centre relative to the town and road network

Estimated ADT`s were therefore calculated from the first principles (see Annexure D, Appendix G7).

Non motorised & Public Transport

It is proposed that pedestrian walkways be provided along the new link road past the site to ease the movement of pedestrians.

It is recommended that the costs of this facility be off-set against the bulk engineering services contributions where applicable.

Conclusions and recommendations

The following can be concluded from the investigations:

- This TIA has been undertaken in support of a newly proposed filling station on Portion 24 (A Portion of Portion 5) of the Farm Hazia 240-JP.
- The proposed township name is Zeerust Extension 5.
- The weekday AM and PM peak hours were considered for the proposed land use.
- A new road link proposed as part of the shopping centre (Autumn Leaf Mall) was assumed to be in place for the purpose of this TIA.
- The proposed road link would result in automatic redistribution of the background traffic.
- The proposed filling station is planned to comprise a left-in, left-out type of access, take off the newly proposed road link.

It is recommended that:

- The cost of constructing the site access to be for the account of developer.
- The payable bulk services contributions (where applicable) be offset against construction of the site access / pedestrians walkways.
- On-site parking be provided in accordance with the requirements of *Zeerust Town Planning Scheme, 1980.*
- The proposed development is supported from traffic and transportation engineering perspective and thus be approved by the roads authorities.

10.9 Socio-Ecomomic Impact Assessment

The following information has been extracted from the Socio-Economic Impact Assessment compiled by Urban-Econ Development Economists**.** *Refer to Appendix G8.*

Urban-Econ Development Economists was appointed to conduct a socio-economic impact assessment of the proposed Hazia Filling Station. The socio-economic impact assessment identifies the potential economic drawbacks as well as opportunities to be created as a result of the proposed development. The socio-economic impact assessment includes the following key actions:

- ✓ Develop a baseline profile of delineated study area to determine development landscape
- ✓ Quantify the economic impact in terms of productions, local GDP, employment and income; and
- ✓ Evaluate the socio-economic impact per criteria.

Summary of the economic impact of the Filling station, by comparing the economic impact on the sectoral composition, GDP growth, the Labour market and the income profile.

Summary of economic impact of the Filling station

Table 7 presents a summary of the economic impact of the filling station.

Table 7: Summary of economic impact of filling station

	CAPEX		OPEX	
Production	R 23.58 Million	R 1 = R 2.12	R 10.04 Million	R 1 = R 1.90
GDP	R 9.32 Million	R 1 = R 0.84	R 4.48 Million	R 1 = R 0.85
Employment	37 Jobs	R 1 Million = 3.33 Jobs	43.33 Jobs	R 1 Million = 8.20 Jobs
Income	R 5.25 Million	R 1 = R 0.47	R 3.40 Million	R 1 = R 0.64

- **Production/New Business Sales** will have a total impact of roughly R23.58 Million and R 10.04 million in CAPEX and OPEX respectively. The impact will result in an economic increase in the construction sector which is current the largest GDP contributor in the secondary sector. In addition, an increase will also be seen in the financial and business services sector and community services sector.
- The total contribution to **GDP** is roughly R9.32 Million and R4.48 Million in CAPEX and OPEX respectively. The impact would be greatly focused on the Construction and Financial & business services which is currently one of the smallest sectors.
- **Employment Opportunities** created amounts to 37 during CAPEX and 43.33 during OPEX per annum. This would have an impact on the high unemployment rate and would lead to higher income levels.
- New **Income** generated amounts to R 5.25 Million and R3.40 Million in CAPEX and OPEX respectively.

From the finding in Table 6 the CAPEX of the filling station would tribute to the economy in the following ways: new production and business sales of R23.58 Million, contribution to GDP of R9.32 Million, 37 employment opportunities and additional income of R5.25 Million. The OPEX will generate R10.01 Million for production and new business sales, contribute R4.48 Million to GDP, create employment of 43.33 and generate additional income of R3.40 Million.

Economic Impact on Zeerust

Economic Impact on Sectoral Composition

The following was concluded from the economical impact on the sectoral composition:

- ✓ The Tertiary sector is the biggest in the economy of Zeerust (82.8%), meanwhile Secondary sector are 11.5% and Primary sector is 5.7%.
- ✓ Wholesale and retail trade (15.1%) is the second biggest contributor in the Tertiary sector and in the economy.
- ✓ Construction (3.8%) is the biggest sector in the Secondary sector, while Electricity, gas and water (3.8%) is the second biggest contributor to the Secondary sector.

The economic impact of the CAPEX and OPEX of the Filling station would have significant impact on the sectoral composition in Zeerust.

The sectors which is the most influenced by the CAPEX of the Filling Station is the Construction sector (60.20%) followed by the Transport & communication sector (7.71%) and Community services (7.48%). The OPEX impact on the sectors is the greatest felt in the Financial and business services sector (64.92%), followed by Community services (13.38%) and Transport & communication sector (8.09%). The total value of the economic value impact of the CAPEX is R23.58 million and the impact of the OPEX is R10.04million.

Economic Impact on GDP Growth

The following was concluded from the economical impact on the economic growth:

- ✓ Economic growth is higher than South Africa's growth and the proposed Filling station would benefit and contribute to the growth.
- ✓ The RMLM followings the same growth pattern than South Africa's growth, thus indicating that the economy of Zeerust is volatile to external factors as well as political crises.

The sectors which will be influenced the most by the CAPEX of Filling Station is the Construction sector (56.28%), Community services sector (9.47%) and the Financial & business services (8.17%). The OPEX of Filling Station will contribute the greatest to the Financial & business services sector (67.53%), Community services sector (14.36%) and Transport & Communication (6.67%).

Economic Impact on Labour Market

The following was concluded from the economical impact on the labour market:

- ✓ The unemployment rate has decrease to 14.8%.
- ✓ Not economically active has increase to 39.8%
- ✓ Employment rate has increase to 45.4%.
- ✓ The large number of unemployment bodes well for development. The economic impact of the development would lead to a decrease in the unemployment rate.

The sectors which will be the most influenced by the CAPEX of Filling station is the Construction sector (65.45%), followed by the Trade & accommodation sector (6.60%) and Financial & Business services (6.59%). The economic impact of the OPEX is calculated to have the greatest impact on Financial & business services sector (88.11%), followed by the Community services sector (3.58%). The total employment opportunities created during CAPEX is 37.09, while the OPEX employment opportunities is 43.33 annually.

Economic Impact on Income Profile

The following was concluded from the economical impact on income profile:

- ✓ No-income households has decreased to 9.6% in 2016 from 15.9% in 2001.
- ✓ Low-income households have decreased 37.2% in 2016.
- ✓ Middle-income households have doubled to 51.1%.
- ✓ High-income households have quadrupled from 0.5% in 2001 to 2.1% in 2016.

The CAPEX economic impact would be greatest felt on Construction sector (58.16%) followed by the Community sector (11.59%) and the Mining sector (9.25%). The economic impact of the OPEX is greatest on the Financial & business services sector (76.86%), while the impact is 13.13% on the Community service sector and 4.62% on the Trade & accommodation sector. The total value of the CAPEX which is contributed to income profile is R5.25 Million, while the OPEX contribution is R3.40 Million per year.

Potential Negative Impact

The potential negative impacts of the proposed filling station are limited job losses from other filling stations in Zeerust, this is due to time-tables of filling stations. Any job losses will be mitigated in a few years and would be insignificant on the broader spectrum of job creation. The proposed filling station would create more employment opportunities that those lost, the nett effect on jobs would be positive.

Other potential negative impacts of the filling station can be related to noise pollution and additional trip generation. But since the filling station would be situated within a commercial precinct and away from residential areas the negative impact is expected to be minimum.

Conclusions

- The proposed Filling station would contribute to the local economy and the economic impact would be positive. Economic growth trends show that Ramotshere Moiloa LM has a higher economic growth than the national average and appears to be more resilient to shocks to the economy. This indicate that the economy has growing potential and can be identified as having investment potential.
- In the Ramotshere Moiloa Local Municipality, the construction sector (3.8%) is the biggest in the secondary sector and 8th biggest sector in the local municipality. This sector would experience growth through the construction of Filling station. The construction sector employs only 0.1% of the workforce in Zeerust, the construction of the Filling station would increase the number of people who is employed in this sector.

- The additional income generated by the Filling station would benefit the local population. The additional income is expected to benefit the lower income households which comprise a total of 54,4% of local households. Any additional income generated in a new development would be welcomed in Zeerust and would benefit the low-income households.
- The impact on employment would be positive, though the impact is expected to be small, any contribution to more employment is an achievement in South Africa.
- In concluding arguments, the economic impact of the Filling station would have a profound impact on the local economy, production, employment and income. This development would contribute to the development of Zeerust and the socio-economic improvement of the local population.

10.10 Feasibility Study

The following information has been extracted from the Feasibility Study compiled by Petrorex**.** *Refer to Appendix G9.*

The feasibility study will include a detailed analytical survey on the feasibility and economic viability inclusive of construction and operation costs involved of the proposed service station facility development. Petrorex will make specific emphasis with regards to the influence of the locality of the property as well as the assessment on the Need and Desirability, which comprises Market Delineation, Market Demand and Market Supply. Based on the findings of the survey the "Applicant" would be able to determine the risk factor involved as well as to make logical deductions obtained from the feasibility study.

The main objectives of this study are:

- Provide evidence of the suitability of the proposed site for the intended development as part of the physical and legal feasibility,
- Description of the site, market feasibility, to determine and estimate the potential market for the products and services that the proposed service station is intended to provide.
- Provide an independent specialist analysis on the capacity of the market to sustain an additional filling station in the area, and examine the likely impact of the proposed development on existing filling station businesses.
- The last phase is to determine whether the project satisfies the financial requirements of the parties, developer, operator and the oil company involved.

<u>Accessibility</u>
Existing traffic counts on the N4 indicates that already high traffic volumes are passing the proposed Zeerust X 5 site on a daily basis.

The proposed filling station development is located adjacent to a Platinum Corridor / N4 and is accessible through a proposed link road connecting Church Street (N4) and Kloof Street. The accessibility of the proposed service station site would not only be from the adjacent shopping centre parking area but is further augmented by exposure to amount of traffic volumes of both heavy and light vehicles travelling eastbound or westbound on the shopping centre proposed link road connecting the N4 and Kloof street via a left in and left out, due to the proposed median, with adequate deceleration and acceleration lanes to ensure safe left in / left out.

There is sufficient space and turning opportunities on site for delivery and refuse vehicles to ensure adequate site circulation. The proposed link road between the two access points, N4 and Kloof Street will also provide additional mobility and accessibility to Zeerust.

The following aspects were taken into account regarding road safety and traffic capacity when considering the availability of Diesel facilities for larger vehicles, inclusive of the fuel delivery trucks:

- The service station is positioned to optimise the line of sight to incoming traffic so that the decision making can be timeously affected.
- Layout to the Site is adequate in order to accommodate the turning radius not only for a large fuel delivery truck but also other truck users to prohibit any damage due to the off-tracking of its rear wheels.
- There are no sharp turn movements that can cause unwanted freight movement resulting in damage and/or loss of valuable freight. In order to prevent these situations trucks would also be required to slow down to speeds well below that of passenger vehicle to be able to enter the site safely.

The Site is accessible from the adjacent connection road eastbound and westbound traffic through:

- A left-in / left-out movement, with deceleration lanes with adequate length to allow for safe left – in / left-out movements.
- A right turn movement for exiting vehicles towards the N4 via the proposed circle located just west of the proposed service station site.
- A right and left turn movement for entering vehicles eastbound on the proposed link road via the adjacent shopping centre parking area to the proposed service station site.

Visibility

The N4 is currently classified as a Platinum Corridor which links Zeerust with Botswana and Gauteng. The visibility of the site can also be classified as an outstanding development attribute due to the fact that the road carries a high number of traffic passing through Zeerust town. As previously stated, some of the road based public transport services run on the N4 and it also distributes traffic to and from the CBD towards different areas of Ramotshere Moiloa Municipal area and also to Botswana and towards Mahikeng.

The visibility profile aims to highlight the exposure of the proposed site which is directly correlated to the potential utilisation of the service station by the passing traffic as well as the motorists visiting the adjacent shopping centre.

The site is highly visible and located directly along the proposed link road connecting the N4 and Kloof Street as well as from the N4 itself. The site will also be a noticeable fixture for motorists visiting the adjacent shopping centre.

The proposed development would be visible from approximately 150 meters westbound and 200 meters eastbound along the proposed connection road.

The visibility profile aims to highlight the exposure of the proposed site which is directly correlated to the potential utilization of the service station by passing traffic as well as the traffic generated by the adjacent shopping centre facility;

- The high visibility levels are likely to attract a high volume of potential consumers owing to the outstanding exposure to the transport market.
- The site enjoys above-average exposure and advertising capabilities
- The visibility of a service station is critical to its success and marketability. Strategic location of the main identification signs as well as the strategic placing of the official road sign boards / brown boards alongside the N4 will increase the drivers' observation capacity at the respective property.

Market Feasibility

Growth Information

It has been identified that DeBeers is seeking a prospecting license in Zeerust to start mining within 7 years. This development would have a significant impact of the inhabitants of Zeerust and the immediate area. If the prospecting is successful and mining operations take on full scale, the people of Zeerust would benefit greatly from this development in terms of employment, education and additional income generation. This bodes well for the proposed development as this would lead to higher expenditure and would benefit the proposed development and the CBD of Zeerust.

Urban-Econalso indicated that there is an effective demand for 2016 is 29 484m² GLA. They also stated that there is a leakage factor, outflow of purchasing-power, of 27.5% due to the current supply in the CBD that does not cater for all the needs of the residents of Zeerust MA, and would thus travel to Mahikeng for shopping.

Therefore this also leads to a leakage, an outflow of purchasing power, for fuel as well. The proposed shopping centre development would insure an injection to retain the outflow of the purchasing – power in Zeerust MA. This will not only benefit the related retail activities but also the proposed service station depending on the generated support of the proposed service station.

Road network

Zeerust is situated on the Platinum corridor, which links areas such as Mafikeng and Rustenburg with other parts of the country in Gauteng, Limpopo and Mpumalanga Province, and has been identified as a crucial public transport corridor within the North West Province.

The Platinum Spatial Development (North West Province) initiative aims to "develop all areas on the N4 Highway that links South Africa's most densely populated areas with the town of Lobatse in Botswana. By developing nodes along the logistical corridor, the aim is to stimulate economic development. Zeerust stands to benefit from increased traffic along this route, which is ultimately intended to link Namibia and Mozambique. The international linkage between South Africa is very important for the economic survival of RMLM as most of the international traffic will have to travel through Zeerust. In essence, the more traffic will have to travel thought Zeerust. the more money will be spent in Zeerust which has been identified as one of the major economic nodes within RMLM.

Such a proposed development could serve as a powerful economic injection for Zeerust and help to further strengthen the role the town plays as an economic node for RMLM and Botswana and also to take advantage of the N4 Corridor which carries a high volume of traffic passing through Zeerust.

The N4 Highway is currently experiencing upgrades and repairs on both sides of the town and there is also mention that the gravel road that leads to Ikageleng will be upgraded and tarred in the future.

Church Street (N4) is an undivided 2 lane National road with a speed limit of 80km/h close to the intersection with Kloof Street. The crossing at Church Street and Kloof Street is a stop controlled intersection. Church Street, passing through the CBD, is then an undivided 4 lane road with a speed limit of 60 km/h. Kloof Street is an undivided 2 lane urban road with a speed limit of 60km/h as it crosses Coetzee Street and Piet Retief Street to the south. Piet Retief Street to the east is a gravel road and to the west a surfaced road. There is a stop control along Piet Retief Street. Kloof Street then continues further south passing the proposed intersection connection road at the proposed shopping centre site before the railway line bridge, crossing over Kloof Street. The next major crossing to the south is Klip Street an east west connection, with minor commercial activities in the east and residential component in the west as it links to the N4 / Church Street in the west.

A link road is proposed as part of proposed Zeerust X 5, to connect the N4 Platinum Highway to Kloof Street. This road will form the northern boundary of the proposed filling station site and direct site access will therefore be taken off this new proposed link road.

The proposed road link would be a public road, meant to benefit the surrounding area and not only serve the proposed Autumn Leaf Mall.

Market supply analysis

This section examines the findings of the market supply assessment undertaken within the trading area. Specifically, it discusses the key characteristics of the service stations located in proximity to the proposed development site.

- Attributes of existing service / filling stations within the local trading area

Competitor sites identified were based on the general guideline "within 3 kilometers of an existing filling station in a built up area." Petrorex identified six (6) existing service station outlets, the closest 0.625 km radius to the furthest at 2.5650 km radius.

Competitor site 1: Zeerust 1 Stop (MBT)
Serves as a Truck Stop facility and is not equipped to serve light vehicle customers. The site is located adjacent to the N4, approximately 0.625 kilometers east of the proposed development making it the closest proximity to the proposed site.

Competitor site 2: Zeerust Ultra (Shell)
Represents Shell's latest visual manifestation and is well equipped to serve its customers. The site is located on the north western corner of the Kerk (Church) Street / N4 Road and Kloof Street, approximately 1.48 kilometers radius North West of the proposed development. Due to site layout and design the onsite maneuverability is sufficient as it offers a dedicated fuel bay for heavy vehicles. The site has sufficient visibility and convenient accessibility from the Church Street / N4 road and mainly serves the transient and commuter trade traveling west to east on the N4 Road.

Competitor site 3: Zeerust Total
This site represents Total's latest visual manifestation and is well equipped to serve its customers. The site is located on Church Street / N4 adjacent to a shopping centre approximately 1.835 kilometers radius northwest of the proposed development. The site has proper visibility and convenient accessibility and mainly serves the transient and commuter trade, west to south as well as the traffic generated by the adjacent shopping centre, along Church Street (N4). Although the site seems to be very crowded at peak times the layout and design the onsite maneuverability is sufficient.

Competitor site 4: Nissan Supreme (BP)
This site does not represent BP's latest visual manifestation and lacks in providing additional profit opportunities such as a convenience shop. Although it is well equipped to serve its customers with fuel it forms part of a motor retail facilities and lacks in amenities. The site is located on the north eastern corner of Church Street / N4 and Russel Street approximately 1.960 kilometers radius northwest of the proposed development. The site has proper visibility and convenient accessibility and mainly serves the transient and commuter trade, west to east. The sites pump and tank configuration limits onsite maneuverability especially during peak hours.

Competitor site 5: NWK Zeerust (Total)
This site does not represent Total's latest visual manifestation and is well equipped to serve its customers. The site is located at the NWK co-op, approximately 2.25 kilometers radius northwest of the proposed development. The site forms part of the larger Co-op layout and design. The onsite maneuverability is sufficient as it offers a dedicated fuel bay for heavy vehicles. The site has visibility and convenient accessibility from the Voortrekker Street and the R49 / President Street which is partly a one way street northbound. Although this site is intended mainly to serve the NWK members it mainly serves the northbound traffic on the R49.

Competitor site 6: Woltemade Motors (Shell)
This site represents Shell's latest visual manifestation and is well equipped to serve its customers. The site is located between Fossman Street to the east and Sarel Cilliers Street to the west on the southern boundary of Church Street / N4, approximately 2.565 kilometers radius North West of the proposed development. Due to site layout and design the onsite maneuverability is sufficient as it offers a dedicated fuel bay for heavy vehicles. The site has sufficient visibility and convenient accessibility from the Church Street / N4 road and mainly serves the transient and commuter trade traveling east to west on the N4 Road.

The majority of the competition sites identified in the market area are located west of the proposed site mainly serving the through traffic on the N4 / Church Street and traffic generated by the CBD.

- Undeveloped service / filling stations in the local trading area

On the north-western corner of the N4/R49 road to the Botswana border an application has been made for a shopping centre development inclusive of a filling station and is pending for a couple of years. This intersection, located approximately 2.5 kilometre radius southwest of the CBD has also been identified as a potential node development.

- Fuel Sales Projection / Market Demand Analysis

This section provides the market demand assessment for the proposed development in order to determine the feasibility of the development. The demand of the facilities are determined by estimating the amount of fuel sales that may be attracted as well as the amount of business attracted to the additional profit opportunities associated with a service station.

Target Market

The primary market and secondary market segments consist of areas that are located within 3km driving distance from the site. Taking into consideration the accessibility, visibility and convenient location of service station site, the trading area in which the service station is going to operate, primarily consist out of the traffic generated by the new shopping centre development traveling as commuter and through traffic on the planned connector route between Kloof Street and the N4 / Church street.

Taking into consideration the proposed shopping centre development site attributes, the existing railway line in the south and the river to the north, the primary market segments are not directly linked to newly connector route or situated on the connector route itself.

The proposed development's primary market segment consists of the proposed shopping centre development that consist of approximately 36 764m² GLA and will be occupied by a variety of tenants with well- known national and regional brand names and a hospital facility.

Trip generation of a shopping centre and the planned fast food facilities can be categorized in the following:

- *Primary trips :*
  These are referred to as new trips, or trips generated by a shopping centre. The visit to the centre or development is the primary reason for the trip. EDS indicated 16%

- *Pass- by trips:*

  Trips intercepted by the centre which are made by motorists on their way to a destination, other than the centre, are known as pass- by trips. EDS indicated 84%

Service Station Volume Projection / Demand Analysis

The effective fuel / petrol demand is one of the means to determine the sustainability of the service station development by means of calculating the potential volumes of fuel sold by the proposed service stations.

Average litres were obtained from surveys done at the service stations in the area.

The average fill per vehicle, facilities provided at the various sites, and estimated current monthly sales were surveyed at all sites within the study area. The average fill expected from the proposed site was consequently estimated, given the location and expected increase in amount and quality of facilities. The average fill at a site also varies depending on the type of traffic that the proposed site is exposed to. Higher average fill rates are generally encountered for sites exposed mainly to transient traffic, while lower average fill rates are generally encountered for sites exposed to local traffic.

Competitor sites were surveyed to determine an average fill per vehicle at a station. These competitor service stations represent the average fill for vehicles within the study area.

When looking at the future demand potential for the proposed service station, a five year growth scenario was considered. Given the characteristics of the site and the future development potential of the area in which the proposed site of the service station is positioned, it is expected that there will be increased volumes of traffic in the area. An additional assumption was made based on traffic volume growth of 3% is in line with CTO traffic growth in the area.

Based on the above approaches Petrorex was satisfied that a reasoned and dependable weighted projection of fuel sales per month at the proposed service station site would the values as indicated in Table 8.

Table 8: Projected average fuel sales per month from Year 1 to year 5

Year	Average LPM
1 - 2017	256,693
2	261,827
3	267,064
4	272,405
5	277,853

Refer to Appendix I, 3, Appendix G9, Volume projection for a detailed analysis.

Volume impact on the existing service / filling stations

It is expected that the competitor service stations that are located closest to the proposed site and also share the same traffic stream with the proposed new service station, will experience a greater negative economic impact than the others, e.g. Competitor site number 2 –Shell Ultra Zeerust service station. The following has been taken into account when assessing the economic impact of the proposed site on the existing service stations:

- The location, road function and access of proposed new service station development;
- Traffic flow in the area together with shared traffic streams; and
- Market area, based on surrounding residential areas.

All competitor sites identified in the CBD of Zeerust are located within primary market area, and may have implications on the target markets of the proposed development as it would partly serves the same traffic stream on Church Street / the N4 that will also serves as a target market for the proposed service station. The proposed service station site is located adjacent to the new link road connecting Kloof Street and the Church Street / N4, as part of a larger shopping centre development and it is largely depended on the traffic generated from the centre itself.

The Traffic Study conducted by EDS – Structural, Civil & Transportation Engineers indicated that it is expected that the proposed future road link will automatically attract some of the background through traffic, resulting in a traffic diversion. ***Refer to Figure 12.***

- It is estimated, based upon the travel time and distance that the new road link would attract approximately:
  - 17% of the through traffic traveling along Kerk Street (N4), across Zeerust CBD.
  - 93% of the traffic currently traveling via N4 and Kloof Street (B-E-D-C). The new movement would be new road link and Kloof Street (B-D-C).
- Approximately 16% of the intercepted trips to the service station would be new or primary trips and ±84% will be the passer-by trips travelling along the N4 Platinum Highway in the vicinity of the site. This is the filling station trips only – shopping centre trips not included.
- The indicated ADT on the proposed link road west to east be 2000 vehicles and east to west 2300 vehicles.

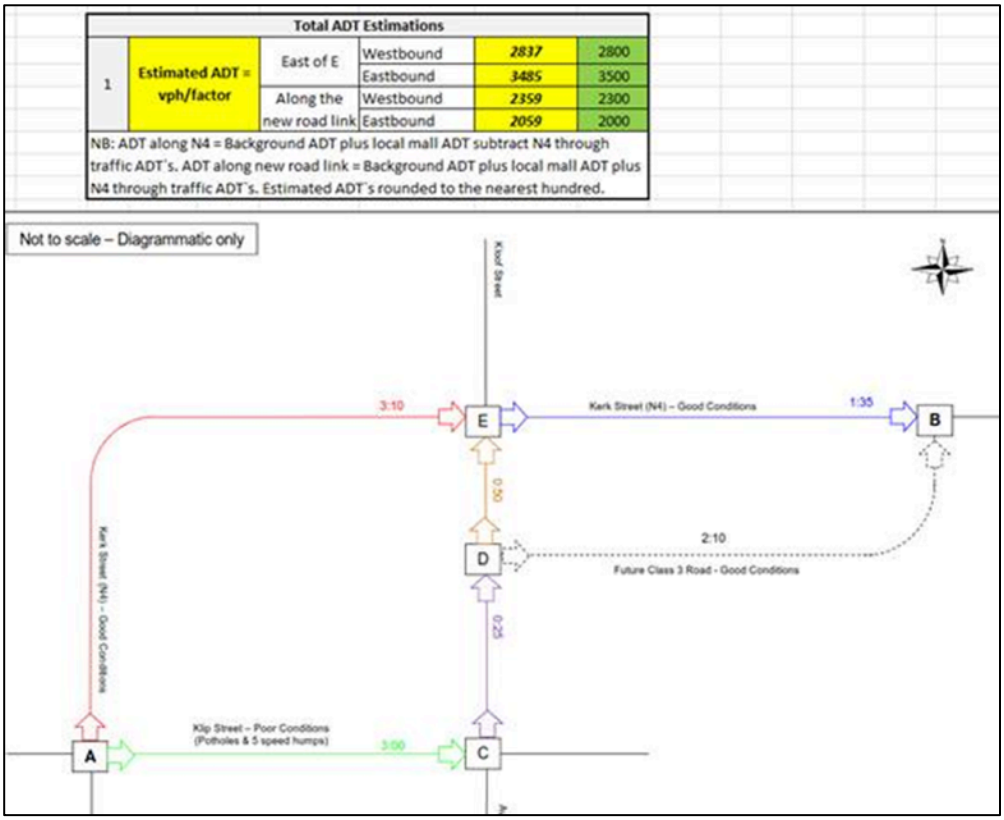

Figure 12: Traffic intersections surveys conducted in Zeerust.

A traffic count was conducted on Friday the 10th and Saturday the 11th of February 2017, by Traftrans – Traffic Engineers – at several intersections on the N4 at Zeerust.

The traffic count conducted on the 10th of February 2017 at the corner of Church Street and Kloof Street at the intersection of competitor site number 2 – Shell Ultra indicates the following:

- Total traffic count on the 10th of February – from 06h00 until 18h00, 7717 light vehicles, Taxi's 746 and heavy vehicles 1066, a total of 9529 vehicles for the indicated 12 hours. Refer to appendix I table 6 to 10.
- The support, from routes 13,14,15 and 16, to this competitor site number 2 indicates that, exclusively to the forecourt, consist of 63.03% of the light vehicles, 87.88% of the Taxi's and 85.29% of the heavy vehicles. An overall 65.64% of all vehicles entering this site exclusively to the forecourt. Refer to appendix I table 11 to 14.
- From the indicated routes 13,14,15 and 16 a total of 7.99% (all vehicles table 14) support rate was calculated with the highest support of 59.28% from route 13 consisting of the traffic traveling west to east on the N4/Church street. Followed by 23.90% route 15, northbound traffic and 11.16% for route 16, southbound traffic, and 5.67% for route 14, westbound traffic. The effective fuel support rate, routes 13, 14, 15 and 16, could therefore be calculated 5.92% for light vehicles, 2.47 % for Taxi's and 1.20% for heavy vehicles and an overall support of 5.24%.

The traffic count conducted on the 11th of February 2017 at the corner of Church Street and Kloof Street at the intersection of competitor site number 2 – Shell Ultra indicates the following:

- Total traffic count on the 11th of February – from 09h00 until 14h00, 3498 light vehicles, Taxi's 375 and heavy vehicles 348, a total of 4221 vehicles for the indicated 5 hours. Refer to appendix I table 16 to 20.

- The support, from routes 13,14,15 and 16, to this competitor site number 2 indicates that, exclusively to the forecourt, 62.70% of the light vehicles, 100% of the Taxi's and 100% of the heavy vehicles. An overall 63.49% entering this site exclusively to the forecourt. Refer to appendix I table 21 to 24.
- From the indicated routes 13,14,15 and 16 a total of 8.69% support rate, all vehicles, was calculated with the highest support of 64.85% from route 13 consisting of the traffic traveling west to east on the N4/Church street. Followed by 19.33% route 15, northbound traffic and 11.19% for route 16, southbound traffic, and 4.63% for route 14, westbound traffic. The effective fuel support rate, routes 13, 14, 15 and 16, could therefore be calculated 11.74% for light vehicles, 5.33% for Taxi's and 5.75% for heavy vehicles and an overall support of 5.52%.

Refer to Appendix I 1, Appendix G9, Traffic Layout, 2. Traffic count - for the detail traffic count conducted at the intersection of Church and Kloof Street.

To assess and quantify the economic impact that the proposed new service station would have on the existing service stations; an evaluation of shared traffic streams was conducted. The traffic counts conducted by Traftrans were utilized to calculate the estimated potential pass.-by traffic at the identified competition site. The traffic shared with the new service station were based on the indicated ADT as indicated by EDS engineers on the proposed link road as indicated 16% primary trips and 84% passer by trips. The first year volume loss was the calculated by means of multiplying the determined traffic shared passing the identified competition site with an average support rate of 5% at an average fill of 22 litres over 29.5 days. The indicated volume loss was then express as a percentile of the identified competition sites throughput.

Refer to Appendix I, 6, Appendix G9, Volume Loss indicating a detail calculation of the potential volume loss off the identified competitor sites. Inclusive an indication of the volume loss recovery in year one to five after the proposed sites has been activated.

Based on the delineated study area, it has been established that the greatest economic impact, in terms of loss of average monthly fuel sales, will be experienced as follows:

- competitor site 2 Shell Zeerust Ultra service station of 65 kilo litres per month,
- competitor site 3, Total Zeersut, 41 kilo litres per month then
- competitor site 4 BP Nissan Supreme filling station by 32 kilo litres per month,
- competitor site 5 Total NWK by 19 kilo litres per month and
- competitor site 6 Shell Woltemade by 26 kilo litres per month.

Based on the modeling for the proposed new service station, it is estimated that it could sell approximately 228 kilo litres of petrol and diesel per month, which would make it sustainable. It is expect that a total of 183 kilo litres , representing a 80% of the proposed site volume projection, will be lost by the existing competitor sites, in the 3 kilometer radius.

Petrorex is of the opinion that the foreseen volume loss will not lead to the closure of competition sites at all.

The conclusion made by Petrorex is that different minimum fuels sales exist for different fuel companies. For example, Sasol has adopted a minimum fuel sale amount of ±300 000 liters per month as an adequate indicator of the potential feasibility of Sasol filling stations. However other factors also contribute to this, such as the capital expenditure and other forms of investments as well as the operational requirements that have been made. For the purposes of this study, the minimum fuel sales amount of ±150 000 liters / month, adopted by some emerging Companies such as Viva Oil (Royal Energy), MBT and Brent Oil (now Puma), will be used.

Taking into consideration that the volume projection clearly indicates that the projected level of sales can be realized as well as the foreseen involvement of Total SA as a registered licensed wholesaler offering a financial involvement and a 20 year transaction for the development and operations, the proposed development is highly likely to be viable.

Financial Viability

The major objective of the financial viability is to determine whether there is sufficient scope in the market to proceed successfully with the Service Station as an investment and business opportunity.

The conclusion made by Petrorex is that the market viability shows that the required level of sales can indeed be realised and from an Operators point of view the business is financially viable.

This will be a **CORO (Company Owned, Retailer Operated)** site "Company Lease site ".This is a situation where the landlord let the property to the oil company as in this scenario to Total SA (Pty) Ltd. The development of the facility must be done by the landlord/developer himself, provided the development is done to the oil company's standards and the landlord/developer will receive a monthly rental amount payable by Total SA. Total SA will then sub-let the business to a tenant/operator nominated and approved by them.

With *CORO (Company Owned, Retailer Operated)* sites, Oil Companies shall recover their capital portion less an entrepreneurial compensation for operating the assets on their behalf. They will recover from the OPEX numbers those expenses that are incurred by the oil company as per the BSS model i.e. pump and tank maintenance, rates and taxes as well as any other assets and operating expenses allowed in terms of the BSS model. *Refer to Appendix F, Appendig G9 – Total SA / Wholesaler Information and Letter of Intent.*

Conclusions and Recommendations – Need and Desirability

The following uses were identified in the current North West Provincial Spatial Development Framework with specific relevance for the local municipality:

- Zeerust is situated on the Platinum corridor, which intersects with the Western Frontier SDL
- Strengthening of Zeerust as a Regional Node in the North West Province
- Strengthening of Zeerust as one of the main centres to enhance corridor development (Western Frontier)

The highest volume of traffic moves on the Platinum Highway and on the Zeerust – Gaborone Corridor. Zeerust is situated on the intersection of two development corridors of national importance namely the Western Frontier (Zeerust – Mafikeng – Vryburg – Taung) and the Platinum SDI (Pretoria – Rustenburg – Swartruggens – Zeerust – Lobatsi). The primary focus of the development corridors is to establish economic development along the major transport routes in order to promote economic growth and the creation of job opportunities. It does not only link with neighbouring provinces but also opens up international linkages with Botswana and Mozambique.

It is imperative to satisfy the needs and requirements of both the transient trade and the traffic from the local trading area to ensure a concurrent and full time support of the Service Station facility. The usage of fuel facilities is the only method to ensure financial benefit towards the Oil Companies and the Operator of the Service Station.

Among complying with the basic requirements the application site also enjoys very specific and desirable special advantages such as:

- The development of the site will contribute to a new and modern look with decent facilities to suit the consumers' requirements.
- The site offers the highest convenience for drivers when filling up with fuel due to the layout and the availability of a suitable access point. Overall the site encourages the reduction of energy consumption by reducing special trips to service stations when filling up with fuel.
- The convenience and safety factors of vehicles travelling at lower speed differentials are highly advantageous and desirable
- The proposed development is visible and accessible via the connection road from the N4 road / Kloof Street to the development. The site will also be extremely visible during night as light poles are positioned in close

proximity of the entrance to the proposed site. The result thereof is that access to the site is safer and the additional illumination contributes to the safety and security aspect of the proposed site.

- Product type distribution on the forecourt and the fact that the canopy and pump island layout is directly behind the ingress point will not cause traffic conflict points. The layout will also allow for proper and safe circulation between motorists and heavy vehicles, including that of fuel delivery vehicles. This principle will apply to the forecourt itself as well as for traffic flow to enter and exit the site.

Each and every logical requirement for a service station is focused on the convenience and safety of the motoring public, which is provided by the proposed service station and it is therefore the ideal site.

All the above factors show that the development of the application site will be desirable. A further desirable factor is also that it provides a much needed and safe facility, secure, well lighted, with ablution and refreshment facilities for motorists.

Taking into consideration that the volume projection clearly indicates that the projected level of sales can be realized as well as the above-mentioned findings, the proposed development is highly likely to be viable.

11 IMPACT ASSESSMENT

The impacts that may result from the planning and design, construction, operational, decommissioning and closure phases as well as proposed management of identified impacts and proposed mitigation measures have been addressed in the Basic Assessment Report.

12 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

An Environmental Management Programme was prepared to detail a plan of action to ensure that recommendations for preventing the negative environmental impacts (and where possible improving the environment) are implemented during the life-cycle of the project.

13 CONCLUSION

The findings conclude that there are no environmental fatal flaws that could prevent the proposed Hazia Filling Station development if the recommended mitigation and management measures contained in the BAR and EMPr are implemented.

****