



Consulting Engineers
"engineering a better way"

**ENGINEERING
SERVICES REPORT
FOR
LENASIA BUILDERS
AND DEVELOPERS CC**

SANDKRAAL FILLING STATION

Erf No 11221, George

25 April 2012



VELA VKE REPORT
QUALITY ASSURANCE ISSUE DATA

Report Title: Engineering Services Report
Client: LENASIA BUILDERS AND DEVELOPERS CC
Project Name: Sandkraal Filling Station on Erf 11221, George
Report Number: VKE1154/1-5/Eng Serv.
Revision Record: Draft

Revision History:

Date	Report Status	Written by	Reviewed by	Issued to	
				Name	Institution
25.04.2012	Draft	W van der Poll	Henry Maart	Francini	Cape-EAPrac

Author: W. van der Poll 20.04.2012
 [Name of Author] Date

Reviewer: _____ 25.04.2012
 [Name of Reviewer] Date

EXECUTIVE SUMMARY

Vela VKE Consulting Engineers have prepared an Engineering Service Report for the Proposed Sandkraal Filling Station on erf 11221, George. The report deals with the impact of the proposed scheme on existing services and evaluates the future services requirements and provides recommendations for the layout of proposed services.

The existing site currently functions as a crèche and after school care facility and is fully serviced. The future impact on existing water, sanitation and refuse collection services is therefore negligible as the current demand on services exceeds the future demand. The impact of the Filling Station on the existing road infrastructure is determined by the future trip generation resulting from the scheme. This is further discussed in the Transportation Study but will result in a bulk services levy contribution towards roads and stormwater.

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Annexure C	George Municipality - Bulk Services Contribution

1. INTRODUCTION

Lenasia Builders and Developers CC requires an Environmental Impact Assessment (EIA) for the development of a proposed Filling Station on Erf 11221 in Parkdene, George.

Vela VKE Consulting Engineers were appointed by Lenasia Builders and Developers CC in April 2012 to prepare an Engineering Services Report and Transportation Study for the proposed **Sandkraal Filling Station**. This specialist input will supplement the Basic Assessment Report (BAR) which is currently being prepared by Cape EA Prac Environmental Management Practitioners for submission in May 2012.

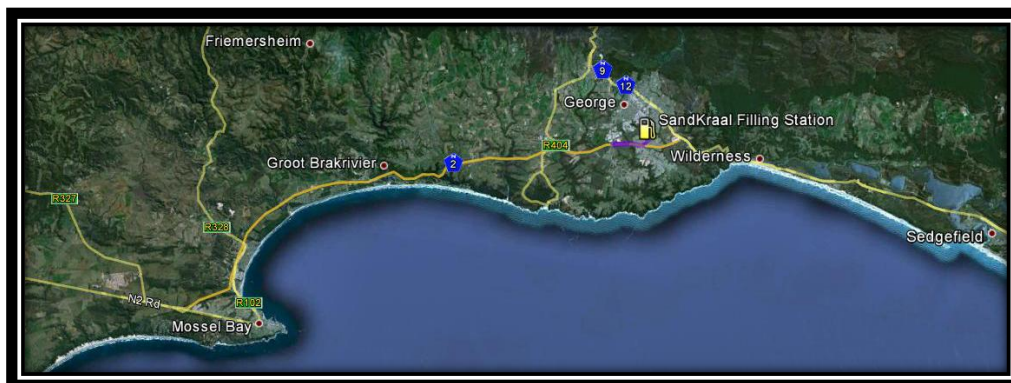
The proposed development will consist of the following land uses;

- Filling Station (115,000 litres fuel storage capacity)
- Small Commercial Facility
- Parking area (22 bays)
- Carwash facility
- Public ablutions
- Staff facilities, bulk store, manager's office and administration area.

The site is 4995 m² in size and the proposed buildings will have a covered area of 309 m². Combined with the canopy, the total covered area is 770m².

2. MAIN ACCESS

The proposed Filling Station is located on the corner of Main Street and Sandkraal Roads in George in the Southern Cape.



Locality Plan - Southern Cape

Main Street can easily be accessed from the N2 via exit 434 onto Sandkraal Road as indicated on the locality plan below.



Locality Plan - George

The impact of newly generated traffic volumes on the Sandkraal/Main Street intersection is dealt with separately in the Transportation Study, which will also evaluate the turning movements of vehicles entering or exiting the proposed entrance to the site.

3. EXISTING SERVICES

Erf 11221 is currently occupied by Life Community Services which provides a crèche and after school care facilities to the local community. The organisation recently installed basic services to the site. These include a 22 mm dia. potable water main connection and water meter from Main Street and a 110mm dia. sewer connection from Golf Street on the Eastern Boundary. These existing services are indicated on the layout plan, Dwg no. **VKE1154-02**, which is attached as **Annexure B**. This plan details the location of existing electrical cables and the stormwater drainage network. The site has a natural gradient towards Golf Street and all rainwater runoff from the site will flow towards the existing 900mm dia. stormwater pipe, which flows in a southerly direction along Golf Street.

George Municipality has confirmed adequate available spare capacity for the proposed scheme within the existing bulk services networks. (Refer to **Annexure A** for communication in this regards)

4. PROPOSED SERVICES

The Municipality of George requires that all new services for any new scheme located within their municipal boundaries are designed in accordance with the “Guidelines for Human Settlement Planning and Design”, otherwise known as the “Red Book”. These design guidelines therefore determine the required capacity and specifications of the proposed services required for the filling station. This will determine the impact of the development on the existing bulk services. The engineering services include the provision of Water and Sewerage, Stormwater Drainage and Solid Waste Removal.

4.1 WATER PROVISION

The proposed buildings which will include offices, retail, administration staff and ablution facilities will have a total covered area of 308.95 m² and will result in a water demand of **1.2 kl/day**.

The Average Annual Water Demand (AADD) was calculated as follows;

Offices and shops/100m² Gross Floor Area * 400 l/day

$$308.95 \text{ m}^2/100 * 400 \text{ l/day} = 1235.8 \text{ l/day}$$

4.1.1 Pipeline Design

The size of pipe components required is determined by the instantaneous peak flow for the development and limited by the velocity. Pipeline design velocities should be approximately 0.6 m/s and should not exceed 1.2 m/s. The building will therefore require at least a **32 mm dia.** erf connection

Note : The instantaneous Peak Flow = AADD multiplied by the peak factor of 18, was determined in accordance with the equivalent erven size.

4.1.2 Water Supply for Fire-Fighting

The fire hydrant flow from municipal reticulation mains should be available to fire fighting teams at all times. The filling station should be considered as a moderate risk area with a minimum fire flow requirement of 1500 l/min. The hydrant should be a minimum of 75 mm diameter sluice valve type and located within 180 m of the fire risk.

Each hydrant will require in the event of a fire, a continuous flow rate for at least 4 hours. The minimum water storage requirement for the filling station is therefore **362.47 m³**

This comprises 48 hrs of AADD plus the fire flow requirements as follows;

$$48 \text{ hrs} * 51.5 \text{ l/h} = 2.5 \text{ m}^3$$

$$1500 \text{ l/min} * 60 \text{ min} * 4 \text{ hrs} = 360 \text{ m}^3$$

The reticulation main supply to the fire hydrant will be sized for a fire flow equivalent of 25 l/s and a minimum of a **75 mm dia. Class 4 u PVC** pipe or similar approved material will be required.

A total of 8* 9 kg Dry Chemical Powder (DCP) Fire Extinguishers per island will also be required in terms of the fire regulations.

4.1.3 Car Wash

The proposed carwash facility should make provision for at least 30 000 l of rain water storage which will be harvested from the building and canopy roofs. (refer to stormwater drainage under item 3.3).The water demand for the car wash will therefore not be included in the calculation for water demand as municipal water will not be used. In the event of a drought and municipal water restrictions, we propose that the car wash makes use of recycled water and remain independent of the municipal water supply.

4.2 SEWERAGE PROVISION

The sewage discharge from business sites need not be taken into account, since these are relatively minor flows that do not peak at the same time as residential flow. The design criteria are as follows

- minimum 160 mm pipe diameter
- minimum gradient of 1:120
- minimum depth 1.4 m below final road level

A provisional layout of the proposed sewer is indicated in Dwg. **VKE1154-02**.

4.3 STORM WATER DRAINAGE

The surface water runoff from paved areas will be designed to convey runoff in a controlled manner along the road surfaces and be channelled through inlets into the existing piped stormwater system. The proposed 450mm diameter pipes have been sized to accommodate a 1: 100 year storm and the location of concrete pipes to be installed is further detailed in Dwg no. **VKE1154-02**.

The management of the stormwater must also assist with the prevention of water pollution as regulated by the departments of Forestry and Water Affairs. To protect the environment against hydrocarbon contaminated surface water run-off and gross spillage, road channels will be installed around the forecourt and re-fuelling areas to direct surface runoff through an oil separator before entering the municipal network. The oil separator tank will intercept hydrocarbon pollutants such as petroleum and oil and prevent their entry to the stormwater drainage system. The clean overflow will then discharge back into the storm water system and the oil will be collected periodically from the tank and disposed of by an authorised agent.

The rainfall runoff generated from the peak discharge during a 100 year event is calculated at less than **200 l/s**. It is proposed that the rainwater runoff from the canopy and building roof areas be harvested and stored in rainwater tanks to further reduce the peak rain water discharge into the piped stormwater network. This will also reduce the water consumption for the development as the harvested water will be used in the carwash facility.

It is estimated that approximately 1 litre of water can be captured from 1 mm of rain over 1 m² of roof space. The covered roof area of the buildings together with the forecourt canopy is approximately 770 m² and can therefore capture 7,700 litres of water from 10 mm of rain. Rain water harvesting is in alignment with the water conservation strategy for the region and Municipal water demand management policy.

4.4 SOLID WASTE REMOVAL

The removal of solid waste will take place from the refuse yard which is located at the rear of the service station. Solid waste will be generated from the forecourt area and from the retail outlet area and will be disposed of as normal domestic waste at the municipal waste disposal site in George. Solid Waste for commercial purposes is calculated on an estimated 0.12 kg/m²/day therefore the filling station building will generate an estimated **37 kg** of solid waste per day.

4.4.1 Waste Management

The National Environmental Management: Waste Act (Act No. 59 of 2008) covers all aspects relating to waste management and must be adhered to at all times. Waste management at the Filling Station shall be strictly controlled and monitored. Only approved waste disposal methods shall be allowed. Management of the Filling Station shall therefore ensure that all personnel are instructed in the proper disposal of all waste and encouraged staff to participate in a recycling scheme. It is proposed that separate receptacles for the disposal of recyclable materials should be positioned in the Waste Collection area. Sorting of the waste into organics, recyclable, hazardous and domestic waste should be undertaken at source if possible. Staff training should be undertaken every six months to capacitate staff in terms of waste minimisation, waste disposal, recycling and other waste issues. No burning, on-site burying or dumping of waste shall occur.

4.4.2 Construction Waste Management

All solid waste generated during the construction stage (including packets, plastic, rubble, cut plant material, waste metals, etc) will be placed in a bulk waste collection area in the contractors camp. The waste will be cleared regularly by a recognised waste contractor. Litter collection bins will be provided within the contractor's camp at convenient intervals and will be regularly cleared. Separation of waste and recycling of paper, glass, etc must be encouraged. Burning or burying of waste will not be allowed. Unutilised, construction materials will be removed once construction has ended, e.g. crushed stone may not be left or randomly strewn around the site.

5.0 FINANCIAL IMPLICATIONS

The policy of George Municipality requires that any new development make a contribution towards the existing bulk infrastructure and towards the development of future required bulk infrastructure capacity. The costs of engineering services to the proposed development will therefore include all capital contributions to George Municipality plus any additional cost for the provision of engineering services that may be required for the development.

5.1 ENGINEERING SERVICES CONTRIBUTIONS

The cost of capital contributions required by George Municipality will be finalised only after the submission of building plans but based on the current formula, the preliminary municipal contributions towards water, sewerage, roads and solid waste are as indicated below:

5.1.1 Sewerage, water services and solid waste

The existing buildings on the site have a combined enclosed area of approximately 400 m². The proposed new building will have a roof area of 309 m². The site currently has a daily occupation of more than 30 persons and the proposed development will have smaller footprint than the existing. The future impact on basic services will therefore be less than the current and the bulk services levy will therefore be credited for these services. A capital contribution towards sewerage, water services and solid waste is therefore not required.

5.1.2 Roads

The Transportation study has calculated a Peak morning trip generation for the Filling Station of 84. The George Municipality has however used a standard trip rate of 100 vehicles per hour in the determination of a Capital Contribution towards roads. The estimated Capital Contribution is therefore **R 194,524.80** (Excl VAT)

This was calculated as follows:

$$36.8 \text{ veh-km/hr} * (\text{R}965 + \text{R}4321) - \text{BKS report}$$

A detailed estimate and breakdown of the calculation is attached in Annexure C

6.0 SUMMARY

Erf 11221, George is adequately serviced for its intended purpose as a Filling Station and the existing sewer, water and refuse services require only minor alterations.

Rainwater harvesting will be promoted in accordance with current water demand management policy.

Stormwater runoff will be managed to prevent any pollution to the existing water course.

7.0 CONCLUSION

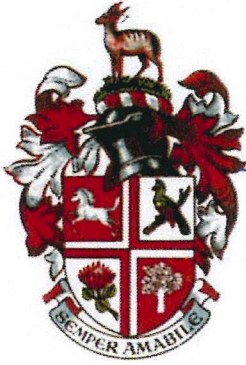
The proposed development will connect to existing municipal services in the area. A Engineering Services Contribution will be required towards the bulk services of George Municipality before final approval of building Plans.

All infrastructure will be designed and constructed in accordance with the applicable guidelines and specifications.

LIST OF ANNEXURES

- Annexure A** George Municipality - Confirmation of Services
- Annexure B** Existing Services Drawing - Dwg no. VKE 1152-02
- Annexure C** George Municipality - Bulk Services Contribution

Annexure A George Municipality - Confirmation of Services



G E O R G E

MUNISIPALITEIT
Wes Kaap

UMASIPALA WASE
Intshona - Koloni

MUNICIPALITY
Western Cape

Posbus / P.O. Box 19 George 6530 Tel: 044 8019111 Fax: 044 8733776

VERW/REF: Erf 11221, George (Filling station)

NAVRAE: **RICUS FIVAZ**
ENQUIRIES:

TEL: **(044) 801 9350**

17 April 2012

Vela VKE
PO Box 10633
George
6530

Attention: Mr W van der Poll

Sir

PROPOSED DEVELOPMENT: ERF 11221, GEORGE

With reference to your request of 17 April 2012, the following refers.

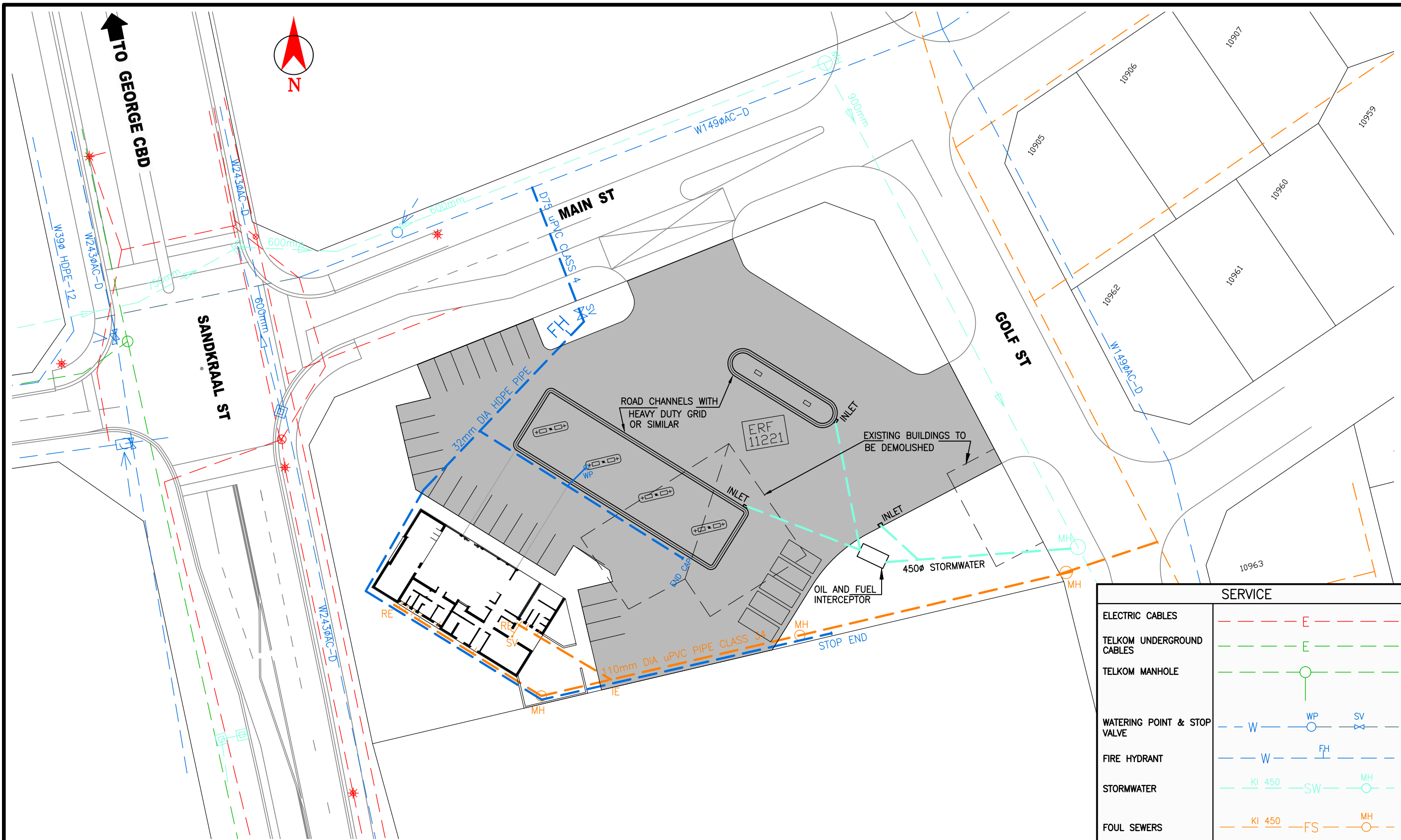
The municipality confirms that sufficient water resources and effluent treatment capacity at the relevant treatments plant are available to accommodate the proposed development on condition that all recommendations of the service report are adhere to.

We trust the above information to be sufficient. Please do not hesitate to contact us if any additional information is required.

Yours faithfully,

HAROLD BASSON
SENIOR MANAGER: CIVIL ENGINEERING SERVICES

Annexure B Existing Services Drawing - Dwg no. VKE 1152-02



SERVICE	
ELECTRIC CABLES	--- E ---
TELKOM UNDERGROUND CABLES	--- E ---
TELKOM MANHOLE	--- (O) ---
WATERING POINT & STOP VALVE	--- W --- (O) --- SV ---
FIRE HYDRANT	--- W --- FH ---
STORMWATER	--- KI 450 --- SW --- (O) --- MH ---
FOUL SEWERS	--- KI 450 --- FS --- (O) --- MH ---



FILLING STATION, PARKDENE -- LAYOUT OF SERVICES ON ERF 11221

PROJECT NO : VKE1154
DATE: APRIL 2012

VKE1154/02

Annexure C George Municipality - Bulk Services Contribution

0

FORM FOR ENGINEERING SERVICE CONTRIBUTIONS - ROADS

1. APPLICANT AND DEVELOPMENT PARTICULARS															
Applicant name: -										Mun Reference No	Municipal Reference Number				
Applicant postal address: -										Date:	25	4	2012	Day/Month/Year	
Development physical address: Erf 12211, George										Region No:	1	Name: George / Conville			
Development description: Filling station										Low Vehicle Ownership Area (Y/N)	N	Publ Trans (Y/N)	N		

2. PREVIOUSLY APPROVED LAND USE (BEFORE APPLICATION)										Click on ESCCalculate to perform calculations										Calculations using rounded off factors			
No	Code	Land use Code = 999 to allow user definitions	Land-use Size		Base Size	Trip rate		Mix-Use potential	Mix-Use %Poten	% Trip Rate Reductions			% Heavy P _{HD}	E80 Axles E _{HD} / HV	Size Adj Factor F _T	% Travel Mun P _{Mun}	Trip Len L _G /2 (km)	Calculated trips		Calculated Veh-km/hr	Calculated E80-km/day		
			Units	Size A _D		AADT _D	Hour _D			Mix-Use	Low-veh	Transit						Trips/hr	Heavy /day				
1	565	Pre-School (Day Care Centre)	Student	30	1	2.00	0.85	0	0.0%	5%	0%	0%	0%	0.00	100%	100%	0.70	26	0	18.20	0.00		
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
Total previously approved (before application)																			18.20	0.00			

3. TOTAL APPROVED LAND USE (AFTER APPLICATION)										Click on ESCCalculate to perform calculations										Calculations using rounded off factors			
No	Code	Land use Code = 999 to allow user definitions	Land-use Size		Base Size	Trip rate		Mix-Use potential	Mix-Use %Poten	% Trip Rate Reductions			% Heavy P _{HD}	E80 Axles E _{HD} / HV	Size Adj Factor F _T	% Travel Mun P _{Mun}	Trip Len L _G /2 (km)	Calculated trips		Calculated Veh-km/hr	Calculated E80-km/day		
			Units	Size A _D		AADT _D	Hour _D			Mix-Use	Low-veh	Transit						Trips/hr	Heavy /day				
1	946	Filling Station	Station	1	1	800.00	100.00	0	0.0%	0%	0%	0%	0.00	100%	100%	0.55	100	0	55.00	0.00			
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
Total approved (after application)																			55.00	0.00			

4. ENGINEERING SERVICE CONTRIBUTIONS TO ROADS															
4a. Basic external road contribution										Unit Cost Rates			Veh-km/hr	E80-km/day	
Traffic generation (Total approved - Previously approved)										Land	Capacity	Strength	36.80	0.00	
Subtotals - Basic external road contributions										R 965	R 4,321	R 665	R 194,524.80	R 0.00	
Total basic external road contribution, VAT Excl														R 194,524.80	
4b. Boundary road contribution (Township establishment only)										Boundary Roads (mete)		Land Value	Construction	Boundary road	
										100% Share	50% Share	per km	Cost/km	contribution	
Class 4 Boundary roads												R 2,488,800	R 7,998,570	R 0.00	
Class 5 Boundary roads												R 1,991,040	R 5,535,774	R 0.00	
Total boundary road contribution														R 0.00	
Total engineering service contribution to roads, VAT Excluded														R 194,524.80	
Value added tax (VAT)														14%	R 27,233.47
Total engineering service contribution to external roads, VAT Included														R 221,758.27	

MEMORANDUM



POSBUS/PO BOX 19 GEORGE 6530
E-POS/E-MAIL: post@george.org.za, TEL: (044) 801 9111 FAKS/FAX: (044) 8733776

KANTOOR VAN SENIOR BESTUURDER SIVIELE INGENIEURSDIENSTE
OFFICE OF SENIOR MANAGER CIVIL ENGINEERING SERVICES

AAN: TO:	Town Planning																																										
VAN: FROM:	R Fivaz																																										
DATUM DATE	25/04/2012																																										
TEL:	(044) 801 9350																																										
INSAKE: REGARDING:	Estimated Capital Contributions :	11221	George																																								
ment proposals	Industrial	(Flats / Single dwellings / Business / Industrial ?)																																									
Note	<table> <tr> <td>Proposed number of 3 bedroom units</td> <td>=</td> <td style="border: 1px solid black; text-align: center;">0</td> <td>units</td> </tr> <tr> <td>Proposed number of 2 bedroom units</td> <td>=</td> <td style="border: 1px solid black; text-align: center;">0</td> <td>units</td> </tr> <tr> <td>Proposed number of 1 bedroom units</td> <td>=</td> <td style="border: 1px solid black; text-align: center;">0</td> <td>units</td> </tr> <tr> <td>Proposed number of 1 Bachelors units</td> <td>=</td> <td style="border: 1px solid black; text-align: center;">0</td> <td>units</td> </tr> <tr> <td>Proposed number of toilet unit > 3 (Industrial)</td> <td>=</td> <td style="border: 1px solid black; text-align: center;">0</td> <td>Toilet units</td> </tr> <tr> <td>Proposed GLA area (Industrial)</td> <td>=</td> <td style="border: 1px solid black; text-align: center;">0.00</td> <td>m²</td> </tr> <tr> <td>Proposed GLA area (Business)</td> <td>=</td> <td style="border: 1px solid black; text-align: center;">309.00</td> <td>m²</td> </tr> <tr> <td colspan="4">Credit options</td> </tr> <tr> <td>Credit for existing 3 bedroom units</td> <td>=</td> <td style="border: 1px solid black; text-align: center;">0</td> <td>units</td> </tr> <tr> <td>Credit for existing GLA</td> <td>=</td> <td style="border: 1px solid black; text-align: center;">400.00</td> <td>m²</td> </tr> </table>			Proposed number of 3 bedroom units	=	0	units	Proposed number of 2 bedroom units	=	0	units	Proposed number of 1 bedroom units	=	0	units	Proposed number of 1 Bachelors units	=	0	units	Proposed number of toilet unit > 3 (Industrial)	=	0	Toilet units	Proposed GLA area (Industrial)	=	0.00	m ²	Proposed GLA area (Business)	=	309.00	m ²	Credit options				Credit for existing 3 bedroom units	=	0	units	Credit for existing GLA	=	400.00	m ²
Proposed number of 3 bedroom units	=	0	units																																								
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Credit for existing 3 bedroom units	=	0	units																																								
Credit for existing GLA	=	400.00	m ²																																								
Tariffs applicable	20011/2012 tariff list applicable up to 30 June 2012																																										
Water =	R 14,350.00	/ erf (75% for Industrial development)																																									
Sewer =	R 17,150.00	/ erf (75% for Industrial development)																																									
S/waste =	R 650.00	/ erf																																									
Roads =	R 2,305.00	/ erf (Refer to BKS report /COTA guidelines- Flats)																																									
Roads =	R 9,250.00	/ erf (Refer to BKS report /COTA guidelines- Single dwellings)																																									
Roads =	Refer to BKS report, COTA & Spreadsheet - Business & Industrial																																										
Elect.=	R 10,750.00	/ erf (Industrial / Business developments refer to Dept. Electro technical)																																									

Water	0 3 Bedroom units	x	R 14,350.00	=	R 0.00
	0 2 Bedroom units	x	R 9,471.00	=	R 0.00
	0 1 Bedroom units	x	R 4,735.50	=	R 0.00
	0 1 Bachelors units	x	R 3,587.50	=	R 0.00
	0 Industrial toilet units >3	x	R 10,762.50	=	R 0.00
	0 m ² GLA Business / 100 m ² X 400L / 100 m ²	x	R 14,350.00	=	R 0.00
	0 Credit for existing 3 bedroom units	x	R 14,350.00	=	R 0.00
					R 0.00
Sewer	0 3 Bedroom units	x	R 17,150.00	=	R 0.00
	0 2 Bedroom units	x	R 11,319.00	=	R 0.00
	0 1 Bedroom units	x	R 5,659.50	=	R 0.00
	0 1 Bachelors units	x	R 4,287.50	=	R 0.00
	0 Industrial toilet units >3	x	R 12,862.50	=	R 0.00
	0 m ² GLA Business / 100 m ² X 400L / 100 m ²	x	R 17,150.00	=	R 0.00
	0 Credit for existing 3 bedroom units	x	R 17,150.00	=	R 0.00
					R 0.00
S/waste	0 3 Bedroom units	x	R 650.00	=	R 0.00
	0 2 Bedroom units	x	R 429.00	=	R 0.00
	0 1 Bedroom units	x	R 214.50	=	R 0.00
	0 1 Bachelors units	x	R 162.50	=	R 0.00
	0 m ² GLA Industrial / 250 m ²	x	R 650.00	=	R 0.00
	0 m ² GLA Business / 250 m ²	x	R 650.00	=	R 0.00
	0 Credit for existing 3 bedroom units	x	R 650.00	=	R 0.00
					R 0.00

Roads

0 Flats units	x	R 2,305.00	=	R 0.00
0 Single dwellings	x	R 9,250.00	=	R 0.00
0 Credit for existing 3 bedroom units	x	R 9,250.00	=	R 0.00

Refer to BKS/COTO report regarding trip generation = R 194,524.80

Exiting credit to be included in BKS/COTO trip Generation

R 194,524.80

Total (Excluding VAT)

R 194,524.80

VAT

R 27,233.47

Total (including VAT)

R 221,758.27

 Jim Fraz