

TRAFFIC IMPACT STATEMENT

FOR

PORTION 0 OF FARM 236, HERMAN

VERGENOEG TOWNSHIP

MARCH 2019

**HOXANA CONSULTING
ENGINEERS**

CLIENT:


NALA LOCAL MUNICIPALITY

PREPARED BY:

HOXANA CONSULTING ENGINEERS

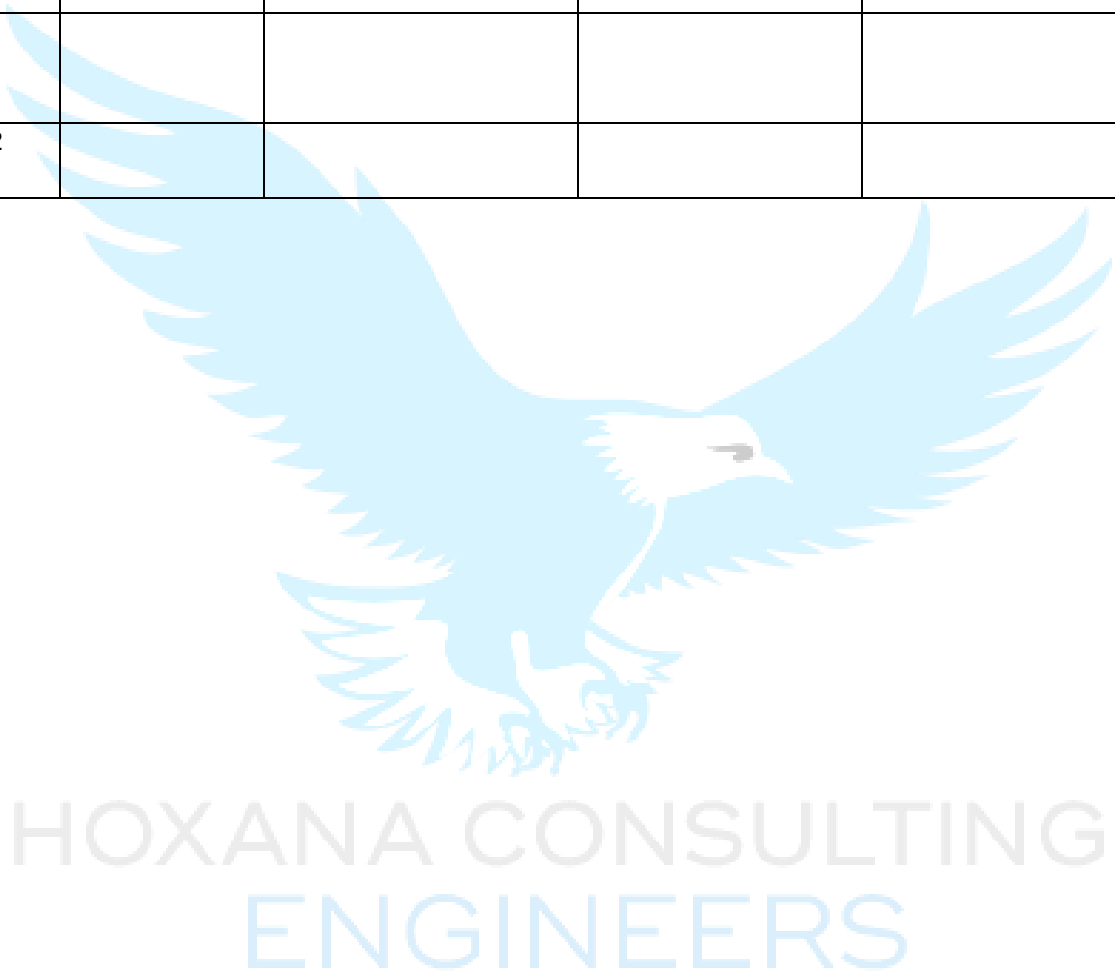


Traffic Impact Statement for Portion 0 of Farm 236, Herman
March 2019

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|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Property Description: | Farm 236, Herman |
| Municipal Area: | Nala Local Municipality |
| Application: | Township Establishment |
| Type of Report: | Traffic Impact Statement |
| Compiled by: | |
| Declaration | I, Livingstone Mashele , author of this traffic impact assessment, hereby certify that I am a professional traffic engineer (registration No. 2018300248) and that I have the required experience and training in the field of traffic and transportation engineering as required by the Engineering Council of South Africa (ECSA), to compile this traffic impact study and I take full responsibility for the content, including all calculations, conclusions and recommendations made herein. |
| Signed: |  Registration No. 2018300248 |
| Date: | March 2019 |

| Deliverable Acceptance | | | |
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| Prepared By: | Bashizi Mudhawa | Date: 23/03/2019 | Signature: |
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| Accepted By: | | Date: | Signature: |
| Accepted and Approved for Payment | | | |
| Accepted By: | | Date: | Signature: |

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EXECUTIVE SUMMARY

Proposals for an establishment of a township on Portion 000 Farm 236, Herman site is currently underway. The site is situated in the Monyakeng in the Northern part of Wesselsbron. The site is currently occupied by informal settler and the township is named Vergenoeg.

In support of the proposed township establishment, Hoxana Consulting Engineers was appointed by Nala Local Municipality (NLM) to conduct a Traffic Impact Assessment for the township establishment. The township will consist 379 single unit residential dwellings, two businesses, and public open spaces.

Monyakeng vehicle ownership is very low with the majority of the population being low income and relying on public or non-motorised means of transport. In addition, the road network in Monyakeng is made of gravel, paved and tared road with good to poor riding quality. Hence, the traffic volumes on Monyakeng roads are generally low.

Based on a traffic study and site visit done between the 22nd and the 23rd of January 2019, it is expected that the traffic generated by the establishment of the township will not exceed 150 vehicle per hour during peak hours. In accordance with the Department of Transport's Manual on Traffic Impact Studies (RR93/365), developments that generate less than 150 vehicles per hour are required to produce a Traffic Impact Statement in which no analysis of both existing and future traffic flows are mandatory. However, a professional informed opinion of potential traffic impact and a proposal to mitigate the negative impact will be provided.

It is recommended in this report that 125th St leading to Vergenoeg be upgraded from gravel to paved road in order to meet the all-weather access stipulated in Nala Transportation master plan. As such, from a traffic engineering perspective, the application for the establishment of the township is recommended.

1. INTRODUCTION

1.1. SITE LOCATION

Nala Local Municipality is situated in the northern part of the municipal region Lejweleputswa District Council. The Nala region is located within a significant agricultural region. It forms part of the so-called “maize-triangle” of South Africa. Apart from grain product, the production of meat and dairy products also features prominently. Nala Local Municipality is made of Bothaville/Kgotsong and Wesselbron/Monyakeng.

Wesselsbron/Monyakeng is located in close proximity of Welkom/Odendaalsrus and is directly dependent on these large urban centers for institutional, commercial support. Vergenoeg is situated along the north-west boundary of Monyakeng. It is currently made of informal settlements.

Nala Local Municipality in general, and Monyakeng in particular has known a negative population growth of -1.9% between 2011 and 2016. Monyakeng is mainly made of lower income residences who work in the adjacent farms. Due to a housing backlog, informal settlements have developed in Vergenoeg and Vergenoeg.

Due to the growth of Monyakeng and the needs to provide basic service to the community of the Vergenoeg, Nala Local Municipality is undertaking a project which will result in the formalisation of the township. As such, proposals for an establishment of a township on Portion 0, Farm 236 Herman site is currently underway. The site is situated in Monyakeng in the North-western part of Wesselsbron as it can be seen in Figure 1 below.



Figure 1. Khali Nkomo locality map



Figure 2. Khali Nkomo Site Map

In support of the proposed township establishment, Hoxana Consulting Engineers was appointed by Nala Local Municipality (NLM) to conduct a Traffic Impact Study for the township establishment.

1.2. PROPOSED DEVELOPMENT

The township will consist 553 single unit residential dwellings, two businesses, two creches, two churches and public open spaces as summarised in

Table 1 . Figure 3 shows the propose layout plan of the township.



Figure 3. Proposed Township Layout Plan

Table 1. Zoning table

| ZONING TABLE | | |
|-------------------|-------------|-----------|
| LAND USE | NO OF ERVEN | AREA (ha) |
| Residential | 379 | 11.78 |
| Business | 2 | 0.25 |
| Community | 2 | 0.45 |
| Municipal | 1 | 0.79 |
| Public Open Space | 2 | 0.19 |
| Total | 387 | |

The propose development of the site is conformed to Nala Local Municipality Integrated development plan for 2015-2016 and its spatial development framework.

1.3. EXTENT OF ANALYSIS

1.3.1. Access road

As shown on Figure 4, the proposed township layout plan will be accessible via 2 main accesses, one at the intersection with the cemetery road and the other at the intersection with 119th Str.



Figure 4. Extent of Study Area

The access point to Vergenoeg are located as per the following coordinates

1. Access point 1: 27°48'57.20"S, 26°22'11.94"E
2. Access point 2: 27°49'4.19"S, 26°22'23.43"E



Figure 5. Road network leading to Vergenoeg

On Figure 5, we can see that most of the road network around Vergenoeg are gravel road. The cemetery road which is partly tar, partly paved road provides an access point to the Township. However, the main access point is located at intersection with 119th street which is recently paved road. The existing minibus taxi route on 119th street service the area with public transport.

1.3.2. External roads

The R505 and the R719 are the only major external roads which is in the vicinity of the townships. However, since it is located more than 1.5km away, it will not be part of this study.

1.3.3. New or improved external and Internal roads

The Nala Local Municipality Transportation Master Plan indicates that the municipality plans provide a road level of service which will ensure all weather access within 500m of dwellings. As such, major upgrades to existing gravel roads to paved road are expected on major roads and all existing internal streets. Internal roads on Vergenoeg would be upgraded to a 5.5m wide class 5 with a 16m road reserve as part of township development.

1.3.4. Public transportation

From the traffic survey done, public transport is dominated by taxis. There is a taxi route along 119th Street.

1.3.5. Pedestrian

There are very few pedestrian walkways made available in Monyakeng. However, Due to the low vehicle ownership in Monyakeng which results in lower traffic volume on internal roads; and due to traffic calming measure such as speed humps most internal roads are safe to use by pedestrians.

2. BACKGROUND INFORMATION

2.1. EXISTING ROAD NETWORK

Wesselsbron/Monyakeng has total internal road network of 96.83 km, and are accessible through Provincial Routes, R34 and R719. The road distribution network is illustrated in Table 2-3 below

Table 2. Wesselsbron/Monyakeng Road Network Distribution

| Description | Gravel Roads (km) | Paved Roads (km) | Tarred Roads (km) |
|-------------|-------------------|------------------|-------------------|
| Wesselsbron | 16.10 | 0.00 | 15.25 |
| Monyakeng | 47.11 | 11.51 | 6.86 |
| Total | 63.21 | 11.51 | 22.11 |
| Grand Total | | | 96.83 km |

The structural and riding condition of the road network ranges from good to poor, with the majority of the road network concluded to be in a fair state/condition. The pavement of the various roads has deteriorated to varying degree and extends, with surface deterioration being the predominant mode of failure. Please refer to annexure ... for a layout of the road network in Monyakeng.

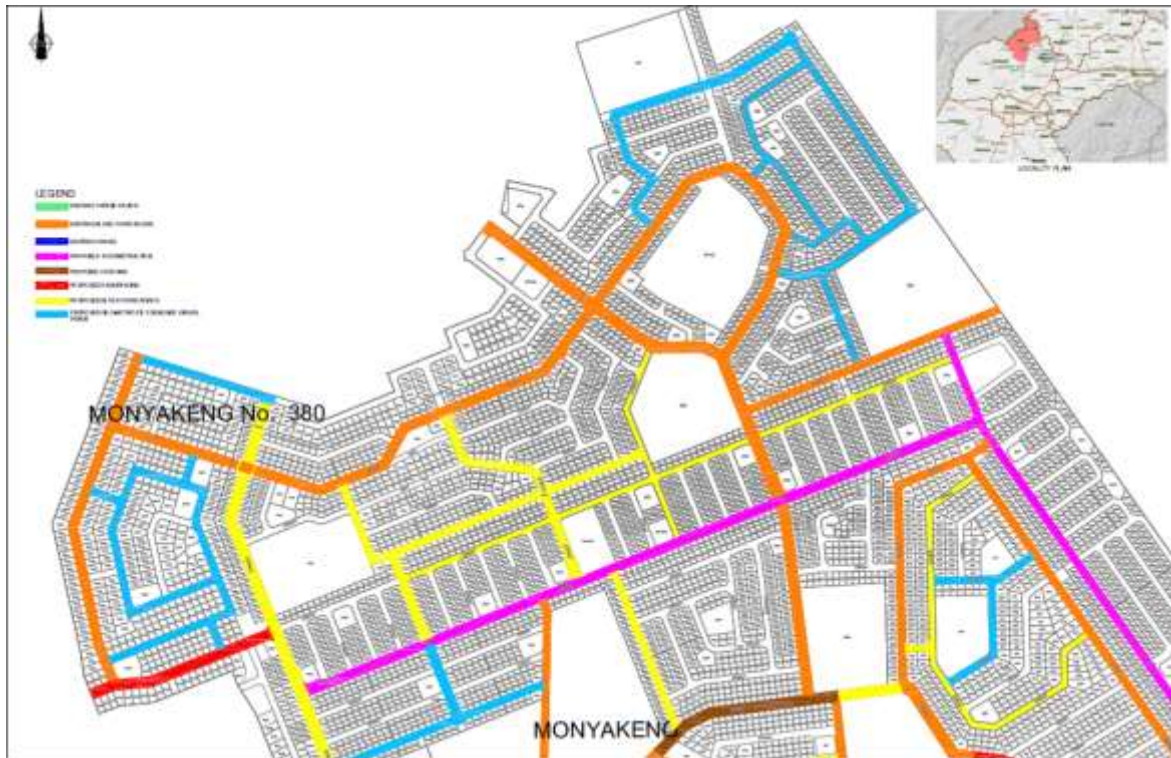


Figure 6. Monyakeng road infrastructure 2013

Traffic control measures consist mainly of stop signs, yield signs, and speed humps. For medium to long distance travel, the community relies mainly on the public transport since the level of vehicle ownerships is low. The shorter interval travels, people walk to and from points of interest.

2.2. LEVEL OF SERVICE

There is not a national policy that defines a basic level of service for roads serving households in residential areas. The Municipal Infrastructure Investment Framework refers to “all weather access to within 500m of the dwelling”.

Within the strategic objectives for improvement of accessibility to public transport, a target has been set of reducing walking distances to public-transport facilities. Most people take about 15 minutes to walk one kilometer, so this objective should be regarded as a minimum. “A far more desirable target for settlement-planning will be to place every dwelling within about seven minutes of a public transport boarding point”, this extend to a distance of around 400-500 m.

The Nala Local Municipality Master Plan proposed road network within Monyakeng is an important part of the vision for the community and is intended to provide connectivity and allow for other modes of transportation to create an attractive space and character of place. The goal is to create a road network that provides focus on the street as it relates to its surrounding form. This focus promotes street vitality and improves the

quality of the pedestrian experience. Nala Local Municipality adopted a level of service as stipulated by the Guidelines for Human Settlement Planning and Design, published and compiled by the Council for Industrial and Scientific Research (CSIR).

For Vergenoeg Township, a 5.5m wide gravel or tar road with a 16m road reserve is recommended. Appropriate traffic control measures should be put in place in order to ensure that pedestrian are not affected. Road side stormwater drainage are imperative to provide all weather access and usability of the road for the community.

Table 3. Description of Road Classes and Classification

| Street Class | Description and Function | Level of Service | Average Daily Traffic | No. of E80 Traffic | Standard |
|--------------|-------------------------------------------------|---------------------|-----------------------|-----------------------------------------|-----------------------|
| Class B | Higher-order mixed pedestrian and vehicle route | Moderate LOS | <600 ADT | 0.3 – 3 x 10 ⁶ E80s per lane | Tarred or Block Paved |
| Class C | Lower-order mixed pedestrian and vehicle route | Moderate to low LOS | >75 ADT | <0.3 x 10 ⁶ E80s per lane | Block Paved or Gravel |
| Class D | Pedestrian and vehicle access route | Low LOS | < 75 ADT | N/A | Gravel |

3. SITE INVESTIGATION

Site investigations done between the 22nd to 25th January 2019 in Vergenoeg. The following activities were done:

- A traffic count of morning and afternoon peak traffic was executed between 6h30am to 8h00am and 4h30pm to 6h00pm.
- A meeting with the road traffic department of the Nala Local Municipality in charge of Monyakeng in which site related information where gathered
- A site walk-through to assess the condition of the road in and around Vergenoeg
- Take photographic records

3.1. PHOTOGRAPHIC RECORDS

As it can be seen on Figure 7 and Figure 8 below, the condition of the roads leading to Vergenoeg are bad. The gravel road has degraded to an extreme level, and in some areas, huge potholes can be overserved.

The level of service of the current roads leading to Vergenoeg do not meet the minimum acceptable level of service i.e. all-weather access. The lack of drainage on the road results in pothole and restrict access for the users.



Figure 7. Intersection leading to Vergenoeg Township.



Figure 8. Road leading into Vergenoeg.

4. TRAFFIC DEMAND ESTIMATION

4.1. TRIP GENERATION

The amount of traffic generated by the township once it is fully established will be calculated based on the methods specified in the TMH17. The traffic generated by business and the community properties was assumed to be negligible due to small surface area they occupy. The area is considered to be of low vehicle ownership, it is not expected to developed into a high vehicle ownership in the future. The result of the analysis is summary in the table below:

Table 4. Trip generation

| Code | Land Use | No | Unit | Hourly Trip Rate per Unit | LV Own. Reduc. factor | Total hourly Trip rate | AM Peak | | | | PM Peak | | | |
|------|----------------------|-----|---------|---------------------------|-----------------------|------------------------|---------|-------|--------|--------|---------|----------|-------|-------|
| | | | | | | | PHF | Split | In | out | PHF | Split | In | out |
| 201 | Single Dwelling Unit | 379 | 1D/Unit | 0.9 | 30% | 113.7 | 1 | 25:75 | 28.425 | 85.275 | 1 | 70:30:00 | 79.59 | 34.11 |

Based on the site investigation, a more conservative 30% vehicle ownership was used instead of 40%. The establishment of Vergenoeg township will result in the generation of 113.7 total peak hourly trips. As it can be seen in Table 4. Trip generation, a total of 85 out going and 28 income vehicles will be expected to be generated by the townships in the morning peaks. In the evening peaks, 80 in-coming vehicles and 34 out-going vehicle are expected.

5. TRAFFIC ANALYSIS – TRAFFIC ENGINEER’S PROFESSIONAL OPINION

In accordance with the Department of Transport’s Manual on Traffic Impact Studies (RR93/365), developments that generate over 150 vehicles per hour, in the peak hours, require a full Traffic Impact Assessment (TIA), while those developments that generate less than 150 vehicles per hour only require a Traffic Impact Statement (TIS). The difference between these two documents is that the TIA must contain recent traffic counts and the analysis of both existing and future traffic flows, whereas in a TIS, no analysis is required, instead the Traffic Engineer’s professional opinion is given more emphasis. Since the establishment of Vergenoeg Township will not generate more than 150 vehicles per hour in the peak hour, a detailed traffic analysis is not required in this study. Therefore, a traffic analyses of the surrounding road network will not be undertaken in this study. The Traffic Engineer will instead provide his professional opinion based a qualitative assessment of his observations and calculations as follows:

It was observed during the site visit that the road network within the study area is operating at an acceptable level of service as no congestion problems, excessive queue lengths and delays were evident on the surrounding road network. The surrounding road network has capacity to handle the additional volumes of traffic that will be generated by the establishment of the Vergenoeg Township project without imposing any undue stress onto the road network. However, in order to meet the level of service stipulate in the municipality road master plan, it is crucial that 125th Street be upgraded to a paved road.

Given the low volumes of traffic that the proposed development will generate, the traffic engineer is of the opinion that the proposed township will have a negligible impact on the surrounding road network in the future. In the opinion of the Traffic Engineer, this project should be approved from a traffic and transportation perspective.

5. RISK / IMPACT ASSESSMENT

The anticipated impacts of the establishment of the township of the surrounding network in Monyakeng has been qualitatively evaluated in order to determine remedial action in order to eliminate, mitigate or manage these impacts.

5.1. Potential deterioration of existing traffic conditions on the external road network

The proposed Vergenoeg Township once fully established is expected to generate additional volumes of traffic on the surrounding road network. Whilst there will be an increase in traffic flows along these roads, the road network can easily accommodate the increased traffic flows due to the low existing volumes of traffic that utilize the road network. As observed during the site visit, the surrounding road network is operating at well below its capacity and at a good level of service. Therefore, the additional volume of traffic that will be imposed onto the road network as a direct result of this project will not cause the current operating conditions to deteriorate as there is sufficient spare capacity to handle the envisaged volumes of traffic.

The impact of the additional traffic that will be generated by this proposed project on the existing traffic conditions (road capacity and congestion) on the road network is likely to be minimal.

5.2. Reduction of existing road space available for pedestrians and cyclists

The establishment of the township will likely generate pedestrian and cyclists traffic from and to the township. However, as observed during the site visit, the traffic on the existing road is minimal and thus safe for pedestrians and cyclists to use. Additionally, pedestrians could easily be accommodated as the existing gravel road formation is very wide.

5.3. Deteriorating road safety conditions for all road users

It is not anticipated that the development of the Vergenoeg Township will in any way affect the road safety conditions for all road users in and around the Township because of the low traffic that will be anticipated. Additionally, traffic calming measure could be installed in the future should the need arise as it is the case for the rest of Monyakeng.

6. CONCLUSION AND RECOMMENDATIONS

Based on this traffic impact study undertaken, the following recommendation and improvements are suggested in order to meet the minimum level of service:

1. The intersections at the access point to the township be upgraded with the Stop/yield sign,
2. The 125th St should be rehabilitated or upgrade to a paved road given that it is a link to a taxi route,
3. Stormwater drains should be installed on road side to ensure all weather access

This report has investigated the impact of the establishment of the Vergenoeg Townships on the road and transportation network. The Vergenoeg township will be made of 379 single unit residential dwellings. The result of the traffic impact study can be summarised as follow:

1. The Vergenoeg town is expected to generate at most around 114 trips;
2. The intersection leading to the townships need to be upgraded to stop/yield intersections
3. Major access roads and associated stormwater need to be rehabilitated according to the master plan.

Based on the above discussion, the Traffic Engineer's opinion is as follows:

It was observed during the site visit that the road network within the study area is operating at an acceptable level of service as no congestion problems, excessive queue lengths and delays were evident on the surrounding road network. The surrounding road network has capacity to handle the additional volumes of traffic that

will be generated by the construction and operational phases of this proposed project without imposing any undue stress onto the road network.

Given the low volumes of traffic that the proposed development will generate, the traffic engineer is of the opinion that the proposed establishment of Vergenoeg will have a negligible impact on the surrounding road network in the future. In the opinion of the Traffic Engineer, this project should be approved from a traffic and transportation perspective.



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