GREENMINED ENVIRONMENTAL (PTY) LTD

TRAFFIC IMPACT ASSESSMENT FOR THE EXPANSION OF WANSLEY QUARRIES ON PORTION 1 OF FARM 652, EAST LONDON AS PART OF THE SPECIALIST INPUT FOR THE ENVIRONMENTAL IMPACT ASSESSMENT

34273.00C-REP-001-01

TRAFFIC IMPACT ASSESSMENT

DECEMBER 2020

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EXECUTIVE SUMMARY

BVi Consulting Engineers (Pty) Ltd was appointed by *Greenmined Environmental* to conduct a Traffic Impact Assessment (TIA) for the proposed expansion of the mining footprint of Wansley Quarry, East London, falling under the Buffalo City Metropolitan Municipality.

The purpose of this report was to assess the impact of the proposed expansion on the transportation network. The background information was taken from the Background Information Document as part of the Environmental Authorisation process. This report also responds to comments received from registered interested and affected parties during the comment period.

The quarry currently gains access to the greater road network via Road W, linking to the National Route 6 to the west of the site and Road B, linking to the municipal Class 3 Main Road, R102, to the south of the site. Road W is classified as a Provincial Minor Road and Road B is classified as a municipal road. Both roads are unsurfaced.

Existing traffic to and from the quarry is estimated to be approximately 100 loads per day, according to the operations manager. This is in line with the 12-hour traffic survey taken on 07 October 2020, at the intersection of Road W and Road B.

Future traffic generated from the site expansion is estimated to be 200 loads per day. This additional traffic does not affect any peak capacities of the roads or intersections but due to the heavy goods transport generated by the development, the pavement structure of the gravel roads is considered the main impact.

Initial investigations into the impact of the heavy goods transport reveal that this proposed development would require a surfaced access route (Road W). The surfaced access route would be required to conform to the provincial minimum standards for cross-section and be designed to accommodate the expected traffic load that indicate an estimated ES3.

The expanded mining footprint crosses a portion of the provincial minor road (Road W) that falls on the property. This will require realignment of a portion of the road and the provincial roads department should be informed of such action.

The following mitigation measures are recommended with regard to the proposed expansion of the mining footprint at Wansley Quarries:

- It is proposed that only Road W be used for access to the quarry. This will mitigate against the negative impact spread over two roads. It would also allow for the improvement and maintenance of only one access road, as opposed to two access roads.
- It is also proposed that the developer surfaces Road W from the intersection with the National Route 6 up to the property boundary of the quarry to minimum cross-sectional standards and implements the minimum maintenance standards for Road W, as required by the provincial authority. Further investigations and design will be required for the finalisation of the cross-section and pavement structure.

- The developer will be required to maintain the upgraded Road W, according to provincial requirements. This will ensure that the impact of the heavy vehicle transport along the route is mitigated through the operational life of the quarry.

- While the surfacing of Road W is considered the preferred recommendation, it is proposed that the gravel pavement structure of Road W be maintained by means of regular regravelling (scheduling to be established), vegetation clearance and side drainage clearance until such time that the upgrading of Road W to a paved surface becomes financially viable as a result of the quarry operations or within a three year period after commencement of the new activities.

- The necessary communications with the provincial authorities for the realignment of the portion of Road W affected by the expansion of the mining footprint must be initiated.

The comments received through the Environmental Assessment Practitioner's Background Information Document were addressed and were based on the findings, proposed mitigation measures and recommendations of this report.

With the implementation of the abovementioned recommendations and mitigation measures, the expansion of the mining footprint of Wansley Quarry may be supported from a traffic engineering perspective.

ISSUE AND REVISION RECORD

QUALITY APPROVAL

	Capacity	Name	Signature	Date
By author	Engineer	Lee-Ann Petersen Pr Eng: 20180198		07 December 2020
Approved by Design Centre Leader	Director	Dirk van der Merwe Pr Eng: 20120186		07 December 2020

This report has been prepared in accordance with BVi Consulting Engineers Quality Management System. BVi Consulting Engineers is ISO 9001: 2015 registered and certified by NQA Africa.

REVISION RECORD

Revision number	Objective	Change	Date
0	Issue to Client for comments	None	03 November 2020
1	Incorporation of comments by client	Provision for deferred upgrade	04 December 2020

TRAFFIC IMPACT ASSESSMENT COVER PAGE

Information Item	Details / Description
Municipality Name	Buffalo City Metropolitan Municipality
Type of Assessment	Traffic Impact Assessment
Erf Numbers / Farm Names	Portion 1 of Farm No 652, in the Buffalo City Metropolitan Municipality of the Eastern Cape Province
Date of Report	04 December 2020
Details of Assessor	DJP van der Merwe Pr Eng dirkvdm@bviwc.co.za ECSA registration number: 20120186 M Eng (Transport), University of Stellenbosch
Address	BVi Consulting Engineers Edison Square c/o Edison Way & Century Avenue Century City 7441

DJP van der Merwe Pr Eng

CERTIFICATION

It is herewith certified that this Traffic Impact Assessment has been prepared according to requirements of the South African Traffic Impact and Site Traffic Assessment Manual.

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CHAPTER 1 INTRODUCTION

1.1 TERMS OF REFERENCE

BVi Consulting Engineers (Pty) Ltd was appointed by *Greenmined Environmental (Pty) Ltd* to conduct a Traffic Impact Assessment (TIA) for the proposed expansion of the Wansley Quarries on Portion 1 of Farm 652, East London.

The proposed project, as described in the Background Information Document (BID) (Departmental Reference No: EC 30/5/1/2/2/228 MR) provided by *Greenmined Environmental*, includes the expansion of the mining footprint to 37.8575 ha. At the time of this report, the end of the first-round comment period for the BID document had been reached.

This TIA forms part of the specialist input for the environmental impact assessment.

1.2 OBJECTIVES

The purpose of this report is to investigate and assess the impact of the proposed expansion on the road and transportation network. The objectives of the TIA are to determine the following:

- The local impact of the proposed development on the road and transportation system surrounding the development, with a particular focus on heavy goods transport;
- Whether it is possible to accommodate the proposed development, with or without the implementation of mitigation measures;
- The mitigation measures and improvements that may be required to accommodate the proposed development in order to address the comments received through the Background Information Document; and
- Propose a route that should be used by the development traffic to minimise impact.

1.3 EXTENT OF THE STUDY AREA

The site is in a rural environment and is linked to the greater road network by unsurfaced roads. Based on the location of the development, the following roads were included in the scope of this assessment:

- Road W, from the intersection with National Route 6, up to the quarry access; and
- Road B, from the intersection with municipal main road R102, up to the intersection with Road W.

Information from the provincial and local authorities was also considered in the study.

1.4 ANALYSIS PERIODS

A 12-hour traffic count was conducted at the intersection of Road W and Road B. The full 12-hour count and the AM and PM peak hour traffic scenarios were investigated as part of this report.

1.5 REFERENCE DOCUMENTATION

In order to compile this report a number of other documents were referenced. These are summarised below:

- *South Africa Committee of Transport Officials* 'TMH 16 Volume 1 South African Traffic Impact and Site Traffic Assessment Manual', (August 2012);
- *South Africa Committee of Transport Officials* 'TMH 16 Volume 2 South African Traffic Impact and Site Traffic Assessment Manual', (August 2014);
- *South Africa Committee of Transport Officials* 'TMH 17 South African Trip Data Manual', (September 2013);
- *South African Roads Agency Limited* 'TRH 3 Design and Construction of Surfacing Seals' (May 2007)
- *South Africa Committee of Transport Officials* 'Draft TRH 4 Structural Design of Flexible Pavements For Interurban and Rural Roads' (1996)
- *South Africa Committee of Transport Officials* 'TRH 26 South African Road Classification and Access Management Manual' (August 2012);
- *Municipal and Provincial Road Classification (RISFSA)* – Province of the Eastern Cape, Transport Department

CHAPTER 2 DEVELOPMENT PARTICULARS

2.1 SITE LOCATION AND BOUNDARIES

The site of Wansley Quarries is located on Portion 1 of Farm 652 in East London.

The site is land-locked and access to the road network is gained by Road W, leading to the N6 in the west and by Road B, leading to the R102 in the south.

Figure 2-1 below shows the location of the site in relation to the major roadways.

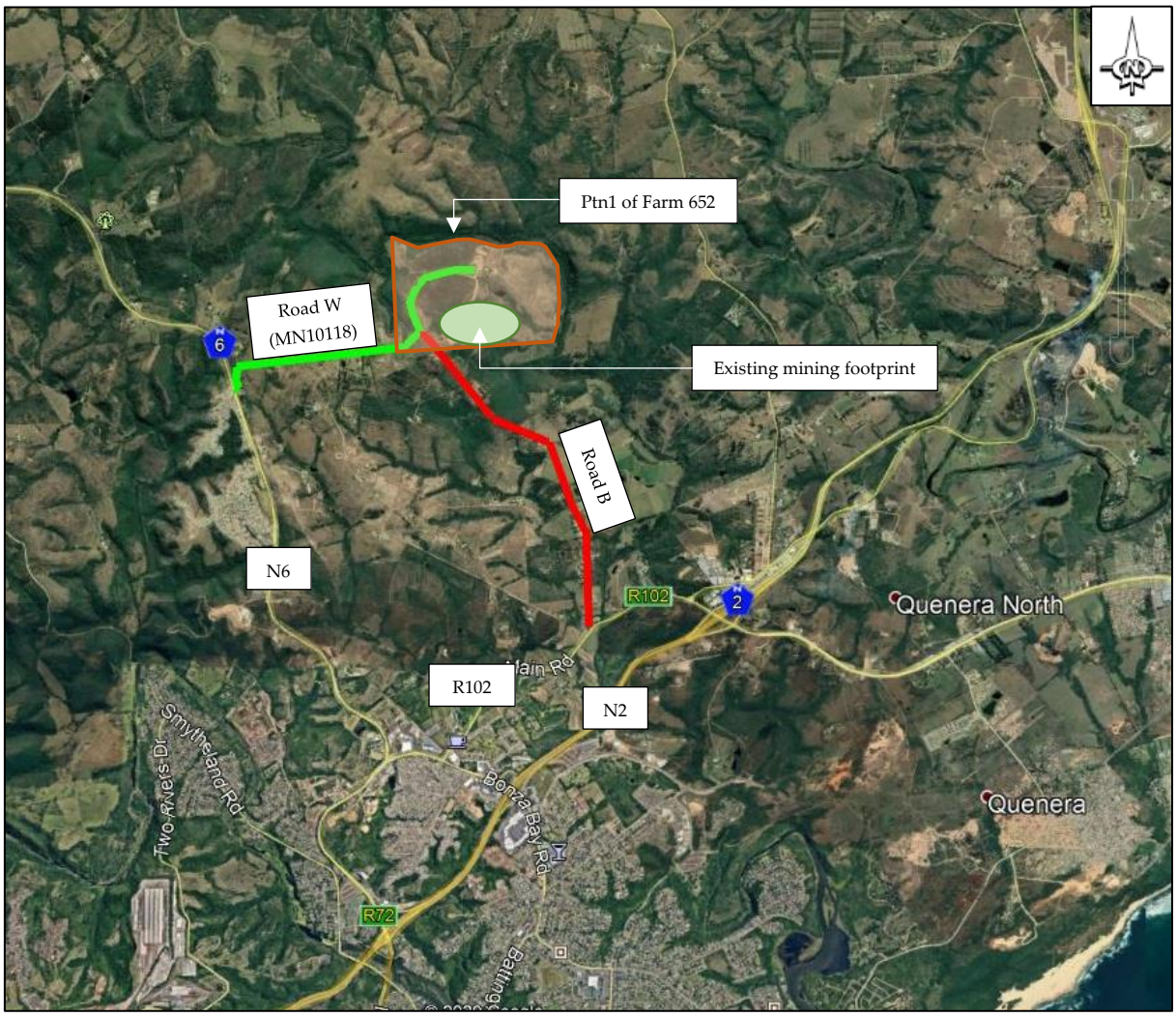


Figure 2-1: Locality of Wansley Quarries, Portion 1 of Farm 652, East London

2.2 EXISTING LAND USE AND ZONING

According to the *Chief Surveyor Cadastral Spatial Data Viewer*, the total extent of Portion 1 of erf 652 is 1 330 991.66 m². The BID indicates that the property is currently operating as a quarry, with an existing approved mining footprint of 5.2149 ha (52 149 m²).

2.3 PROPOSED LAND USE AND DEVELOPMENT ENVIRONMENT

It is envisaged that the proposed extension increases the total mining footprint to ±37.8575 ha. The co-ordinates for the proposed extension area, as extracted from the Background Information Document, are listed in *Appendix A* of this report.

CHAPTER 3 STUDY AREA

3.1 EXTERNAL ROADWAYS AFFECTED BY DEVELOPMENT

The road network classification has been obtained from *Department of Transport – Eastern Cape*.

The roads affected by the development and included in this assessment are listed in the following table. Road classification has been made according to the *Municipal and Provincial Road Classification (RISFSA)*, as received from the provincial authorities.

Table 3-1: Existing roadways affected

ROAD NAME	ROAD CLASS	DESCRIPTION
Road W – MN10118	Class 5 Provincial Minor Road	This road is an unpaved provincial road with one lane per direction.
Road B	Municipal Road	This road is an unpaved road and is a municipal road.
National Route 6	Class 1 National Road	In the vicinity of the study area, this road is a single carriageway with one lane in each direction and paved shoulders
R102 – MR686	Class 3 Main Road	In the vicinity of the study area, this road is a single carriageway with one lane in each direction and unpaved shoulders.

The road lengths, as measured from *Google Earth*, are as follows:

Table 3-2: Road W and Road B lengths

ROAD	KM DISTANCE	COMMENT	SEGMENT LENGTH [km]
Road W	km0.0	Intersection with N6	-
Road W	km1.9	Intersection with Road B	1.9
Road W	km2.95	Quarry entrance / end of minor road	1.05
Road B	km0.0	Intersection with R102	-
Road B	km3.25	Intersection with Road W / end of Road B	3.25

The following should be noted for the traffic investigation:

- Road W is classified as a Provincial Minor Road up to the access to the site, beyond the intersection with Road B. (See Figure 2-1 for reference.)
- While Road B is indicated as a private road on the network information diagramme (See *Appendix B*), the municipal authorities have indicated that it is deemed a municipal road and is subject to the requirements of the local roads authority.

- Road W is a gravel road. Portions of Road B, closer to the intersection with R102, indicate that it was previously surfaced. The details and history of the surfacing are unknown but most surfacing has been stripped and maintenance is not evident.

No future upgrades of these roads are foreseen by the provincial or municipal authorities.

3.2 SITE ACCESS

3.2.1 Servitudes and right of way

The servitudes and affected properties have been sourced from the property search portal of the Chief Surveyor-General (https://csg.esri-southafrica.com/spatialdataviewer/). From this site, the servitude is indicated for Road W, the provincial road. For Road B, servitudes are indicated as well as erf RE/821. The representation of the servitudes is shown in the figure below.

Figure 3-1: Servitudes for Road W and Road B

It should be noted that the extents of the servitudes (i.e. widths, continuity and servitude alignment compared to road alignment) and the conditions of right of way, if any, have not been obtained during this phase of the project and may require the services of a land surveyor to be confirmed.

3.2.2 Provision of site access

The provision of site access is addressed as follows in the *TRH 26*:

> *"Each portion of land is entitled to access to the public road network and the right of access to the road or street system cannot be denied.*
>
> *…*
>
> *Where access to property is permitted:*
>
> - *The proposed access must comply with all the requirements of this manual* (TRH26) *as well as those provided in the TMH 16 South African Traffic Impact and Site Traffic Assessment Manual of COTO (2012).*
> - *It is on condition that the owner of the property will be responsible for improving the access should such improvements become required. This improvement may include geometric improvements or the installation of a traffic signal, roundabout or interchange when warranted or required by the road authority"*

The existing access routes along Road W and Road B are considered as site access for the current scenario.

3.2.3 Positioning and layout of site access

The position of the existing access from the property is deemed suitable for the proposed expansion.

It should be noted that the proposed expanded mining footprint overlays the existing internal access road on the site. A portion of this route is marked as part of Road W (MN10118) according to the provincial and municipal road network information received. This will therefore require the realignment of a portion of this provincial road. The provincial roads department will need to be informed of such action.

This drawing information has been attached as *Appendix B* to this report. An extract from the drawing is shown below, and can be compared to the existing access route as indicated in the proposed expansion area indicated in *Appendix A*.

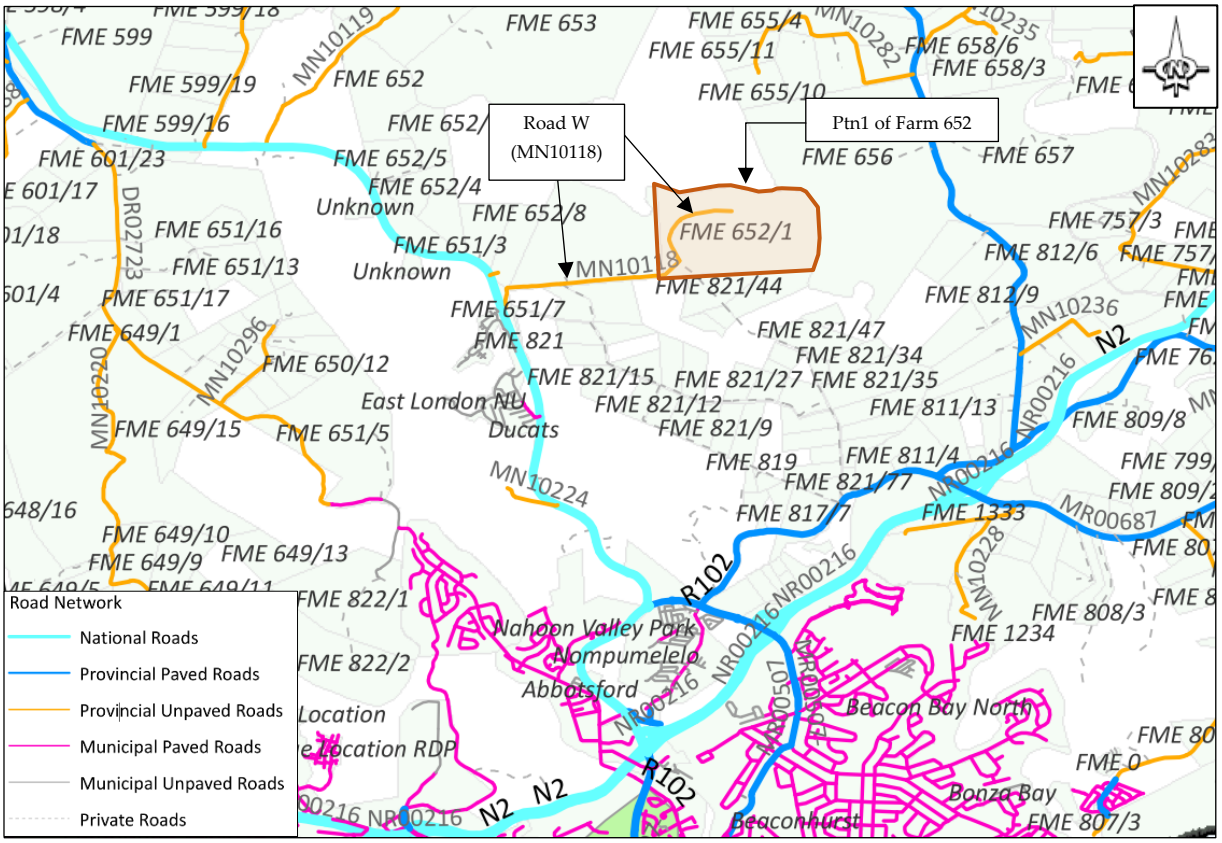


Figure 3-2: Extract of provincial and municipal road network information

An internal site traffic assessment will also provide further insights to the traffic movement through the expanded site and how it would tie in with the access road.

3.3 INTERSECTIONS SELECTED FOR ANALYSIS

Due to the nature of the site development, the roads affected need to take into consideration the accommodation of heavy vehicles along the route. A 12-hour traffic count was conducted at the intersection of Road W and Road B on 07 October 2020.

This intersection count provided the most direct data relating to the existing traffic experienced on site. Not only does this count provide information relating to possible peak periods, but also indicates the current impact of heavy vehicle traffic through the course of the operations of the quarry.

CHAPTER 4 TRAFFIC ASSESSMENT

4.1 TRAFFIC SURVEY DETAILS

The existing traffic demand at the selected intersection was obtained by means of manual 12-hour intersection count (in 15-min intervals) on 07 October 2020 from 06h00 to 18h00. The location of this intersection in relation to the development is shown in *Figure 4-1* below.

Figure 4-1: Traffic count location

The traffic survey data is attached in *Appendix C* to this report.

The following photos indicate the intersection environment, showing the unpaved roads.

Photo 4-1: Road W / Quarry Road leg, in direction of quarry

Photo 4-2: Road W leg, in direction of N6

Photo 4-3: Road B leg, in direction of R102

The photos indicate narrow gravel roads, with overgrown vegetation, poor drainage and limited sight distance.

4.2 PEAK HOUR VOLUMES

The hourly volumes indicate slight peaks in the morning between 09h15 and 10h15 and in the afternoon between 14h45 and 15h45. The following peak values have been extracted from the data of the 15-min intervals of the 12-hour counts:

Table 4-1: AM Peak hour traffic volumes at study intersection

APPROACH -MOVEMENT	VEHICLE TYPE		
	LIGHT	HEAVY	TOTAL
Road W (from N6) - RT	7	0	7
Road W (from N6) - LT	3	6	9
Road W / Quarry Rd (from quarry) – RT	4	3	7
Road W / Quarry Rd (from quarry) – TH	1	2	3
Road B (from R102) – TH	3	4	7
Road B (from R102) – LT	6	0	6
TOTAL	***24***	***15***	***39***

Table 4-2: PM Peak hour traffic volumes at study intersection

APPROACH -MOVEMENT	VEHICLE TYPE		
	LIGHT	HEAVY	TOTAL
Road W (from N6) - RT	3	0	3
Road W (from N6) - LT	2	10	12
Road W / Quarry Rd (from quarry) – RT	1	10	11
Road W / Quarry Rd (from quarry) – TH	2	2	4
Road B (from R102) – TH	1	1	2
Road B (from R102) – LT	3	0	3
TOTAL	***12***	***23***	***35***

These peak counts reflect low peak volumes through the intersection. It should be noted that the traffic assessment it not dependent on the capacity of the intersection in terms of level of service, but rather dependent on the impact of the heavy goods transport as will be discussed in the following chapter.

4.3 12-HOUR TRAFFIC VOLUMES

The total traffic volumes over the 12-hour period are summarised as follows:

Table 4-3: 12-Hour traffic volumes at study intersection

APPROACH -MOVEMENT	VEHICLE TYPE		
	LIGHT	HEAVY	TOTAL
Road W (from N6) - RT	38	0	38
Road W (from N6) - LT	18	72	90
Road W / Quarry Rd (from quarry) – RT	16	66	82
Road W / Quarry Rd (from quarry) – TH	22	19	41
Road B (from R102) – TH	20	13	33
Road B (from R102) – LT	37	0	37

These volumes are illustrated in terms of approach volumes, exit volumes and link volumes per hour as follows in the figures below. A distinction is also made between the heavy vehicle volumes and the total volumes.

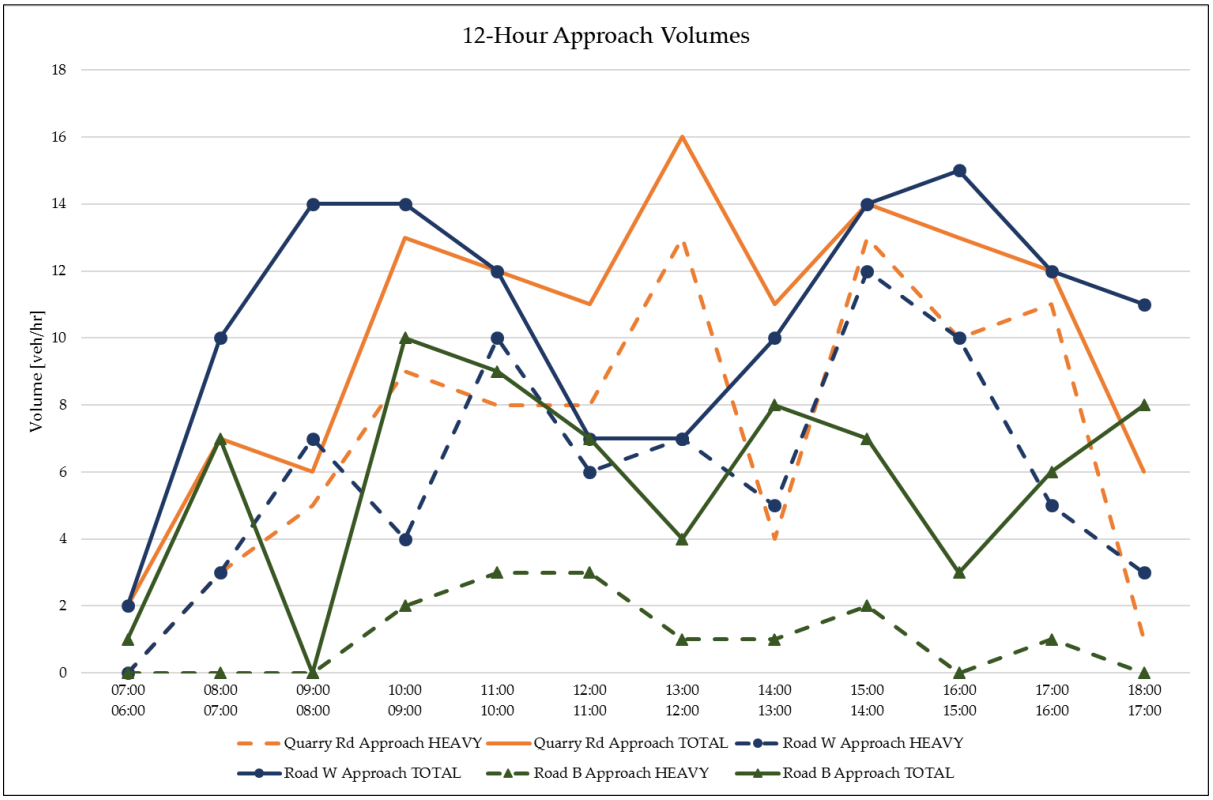


Figure 4-2: Hourly approach volumes for 12-hour count

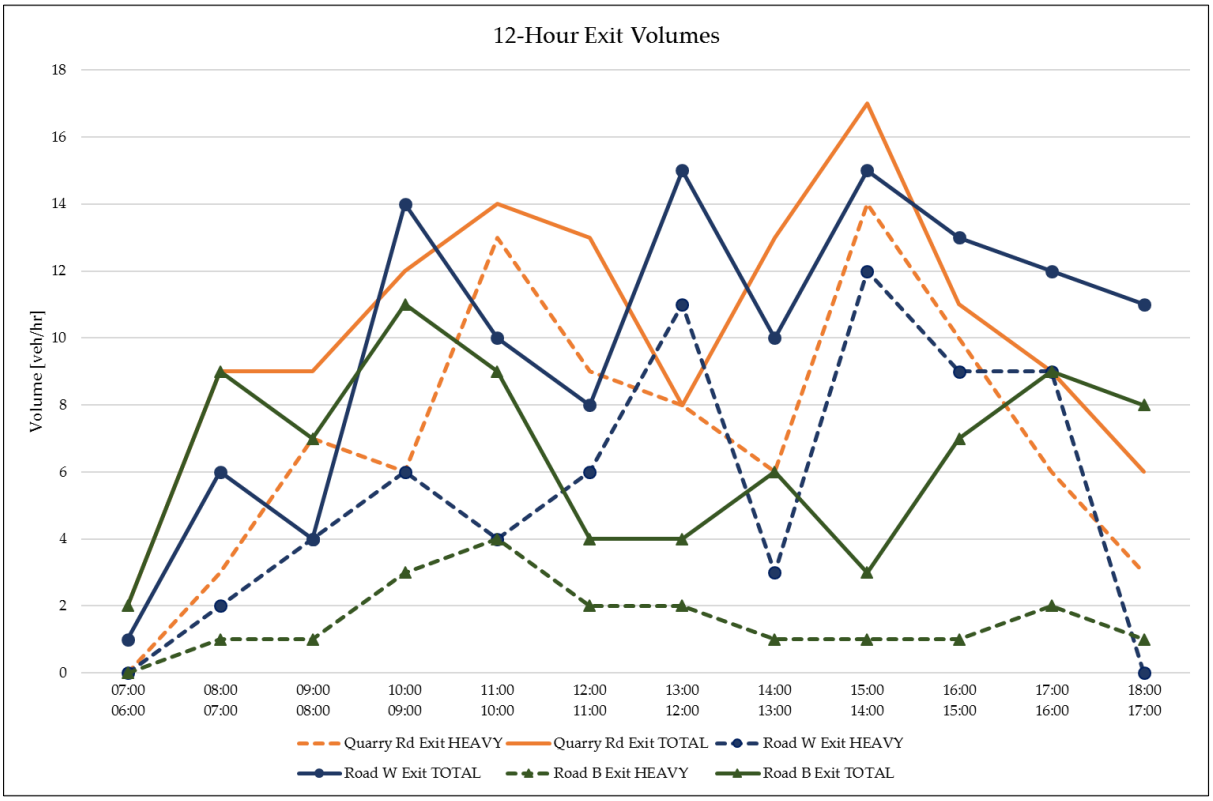


Figure 4-3: Hourly exit volumes for 12-hour count

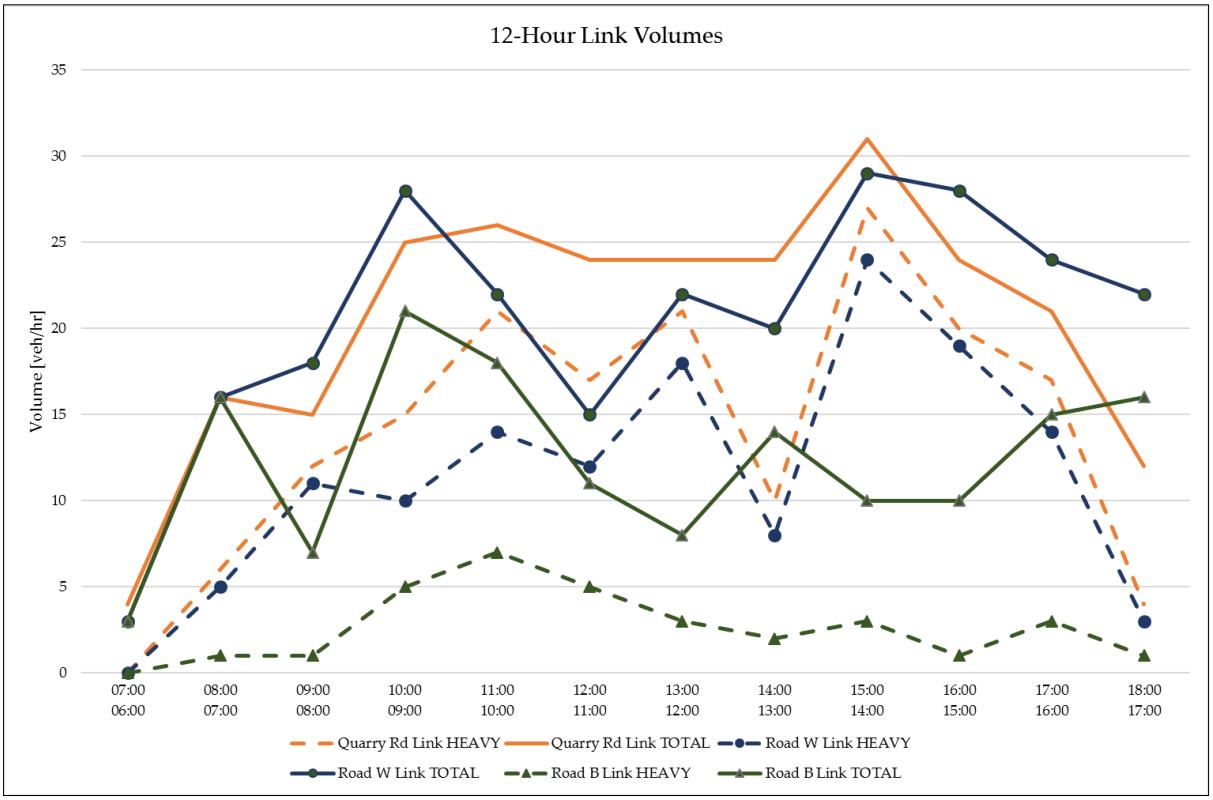


Figure 4-4: Hourly link volumes for 12-hour count

The counts indicate a total of 246 trips in and out of the quarry, consisting of 170 heavy vehicles (85 IN : 85 OUT) and 76 light vehicles (38 IN : 38 OUT) over the 12-hour period. This is consistent with the estimated number of loads of 100 daily loads (i.e. heavy vehicles), as reported by the operations manager.

The survey does not indicate excessive peak volumes. This indicates that the impact of the operations of the quarry is spread throughout the day, rather than during peak times. It also indicates the high proportion of heavy vehicles that the quarry receives, and therefore the direct impact on the gravel road.

The impact of the heavy vehicles on the gravel road is discussed further in CHAPTER 5 of this report.

4.4 FUTURE TRAFFIC VOLUMES

The future traffic volumes due to the proposed expansion of the quarry is not considered a typical development type and therefore, trip generation rates are not according to published rates. The quarry expansion is considered a mining development and is in a rural setting. The future trips due to the proposed expansion have been estimated as 200 total daily loads (i.e. 200 IN : 200 OUT), according to operations management.

4.4.1 Impact on capacity analysis

The proportion of peak hour traffic in and out of the quarry to total 12-hour traffic survey volume (in and out of the quarry) is approximately 11%. Using the same proportion for the future peak hour traffic estimation, it indicates an addition of approximately 18 new vehicle trips (in and out) in the peak hour.

Due to this low additional traffic, capacity analyses for existing and future scenarios for this traffic impact assessment, according to the TMH 16, is not required.

4.4.2 Impact on road pavement structure

The existing and future heavy vehicle volumes do, however, have an impact on the road pavement infrastructure surrounding the site.

It is common practice to use surfacing seals for roads carrying from about 125 to 20 000 equivalent light vehicles (ELV) per lane per day. According to TRH 3 (*Design and Construction on Surfacing Seals*), ELV is calculated as follows:

$$ELV = L + 40H$$

Where
L = Number of light vehicles/lane/day
H = Number of heavy vehicles/lane/day

For the existing development, with information taken from the 12-hour survey, the ELV is calculated as follows:

$$ELV = 38 + 40 \times 85$$
$$= 3\,438$$

It should be noted that this value for ELV is considered conservative, as the data from the survey reflects a 12-hour survey and not a full 24-hour cycle for the daily ELV calculation.

The impact of this existing scenario on the gravel pavement structure is therefore considered to be detrimental to the effective maintenance of the gravel road. The existing scenario indicates that the gravel pavement structure requires an upgrade to a surfaced pavement structure by the developer.

Considering the expected expansion of the quarry and expected increased heavy traffic, a future ELV of 8 038 ELV per lane per day can be expected when considering only an increase in heavy traffic, and ignoring an increase in light vehicles. This calculation also indicates that the gravel pavement structure requires an upgrade to a surfaced pavement structure.

This heavy goods transport impact, with mitigation measures, is presented further in CHAPTER 5 of this report.

CHAPTER 5 HEAVY GOODS IMPACT ASSESSMENT

5.1 TRAFFIC IMPACT DUE TO HEAVY GOODS TRANSPORT

5.1.1 Traffic impact on transport route

The current access from the site to the greater road network follows the Provincial Minor Road, Road W, or the municipal road, Road B. These roads also provide access to surrounding agricultural properties.

According to the survey and feedback from the developer, heavy vehicles en route to Gonubie (south-east of the site) use the Road B. The rest of the vehicles make use of Road W. This is an undesirable impact, as both routes are unpaved.

While the route length via Road B is approximately 1 km shorter than the route via Road W in the direction of Gonubie, the use of both routes may lead to a requirement of increased maintenance of both routes.

It is therefore proposed that only Road W be used by the quarry as access route to the greater road network.

5.1.2 Traffic impact on pavement structure

As discussed in Section 4.4.2, the existing heavy vehicle traffic indicate that a surfaced pavement structure be implemented. In conjunction with only Road W to be used by the quarry, it is also proposed that the developer surfaces Road W to minimum cross-sectional and pavement structure standards as required by the provincial authority, to be designed in line with the expected traffic along the road.

These measures will ensure that the impact due to heavy goods transport is mitigated along Road W by means of a surfaced road.

5.2 ROADS INFRASTRUCTURE CONSIDERATIONS

5.2.1 Road geometry standards

The existing geometric standards are inconsistent along both routes. The roads lack sufficient drainage, cross-sectional slope and, in places, do not have minimum width for two lanes.

Excessive speeds along Road W may also be addressed by means of a suitable cross-section. Road W is a provincial road and speed humps in this environment are discouraged. The implementation of a cross-section indicating minimum lane widths, in accordance with minimum standards, and provision of side drainage would decrease the perceived cross-section width and thereby reduce comfortable operating speed.

The proposed upgraded cross-section for Road W will be in accordance with the minimum standards of the provincial authority and will require suitable maintenance measures to be implemented by the developer.

It is envisaged that the ultimate typical cross-section will be considered a low-volume sealed road. The following typical cross-section is proposed for Road W:

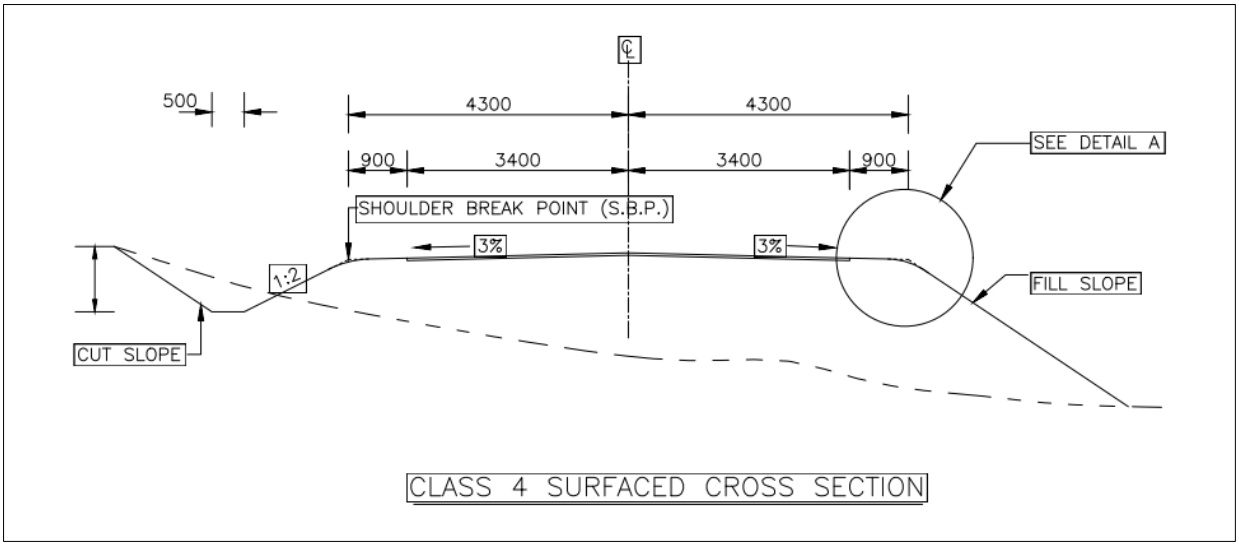


Figure 5-1: Typical cross-section for Class 4 low-volume sealed road

The improvement at the intersection of Road W and N6 will require engagement with the national roads authority, SANRAL, to ensure that the geometric standards of the intersection are considered and acceptable to the relevant geometric design standards.

5.2.2 Road pavement structure

No existing road pavement structure information has been sourced at this stage of the project.

The proposed upgrade from gravel road to surfaced road requires the estimation of expected traffic over the structural design life of the pavement.

The following input is considered for an initial estimate of structural bearing capacity:

- 200 loads per day (i.e. 400 trips in and out);
- 15-year structural design period;
- 2.5E80's per heavy vehicle (considering impact of fully laden vehicles);
- 5-day week operation of quarry; and
- No other growth factors considered.

This initial estimate is considered conservative and indicates a possible structural bearing capacity approximately 2.0 MESA (2 million equivalent standard axles). According to TRH 4 (*Structural Design of Flexible Pavements for Interurban and Rural Roads*), this equates to an ES3 pavement design class.

A typical pavement design for the expected traffic loading is presented in TRH4's catalogue design for wet regions as follows:

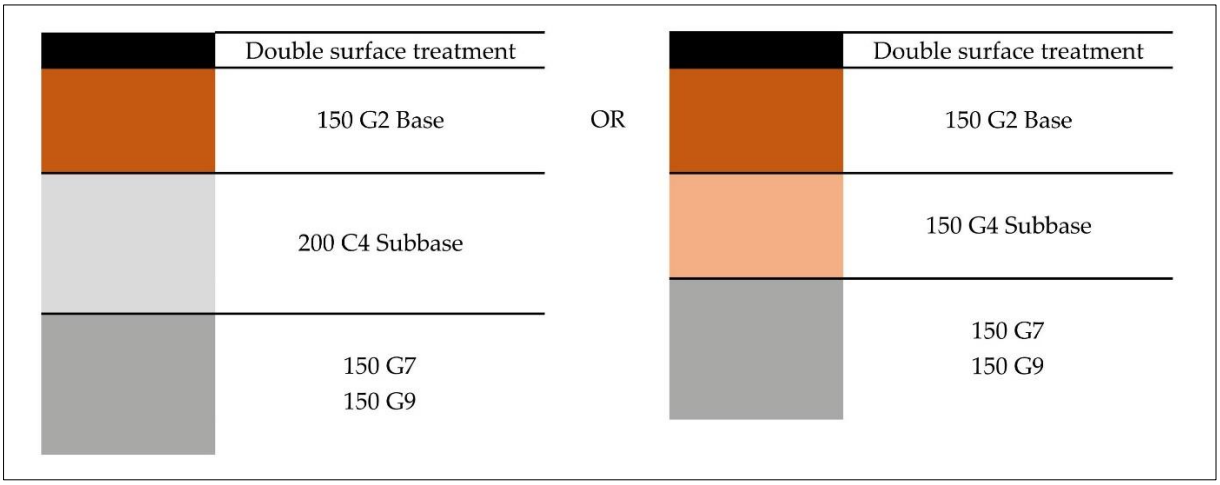


Figure 5-2: Proposed pavement structure according to TRH4 catalogue (Granular base, wet region, ES3, Category C Road)

It should be noted that this is an initial assessment of the type of pavement structure to be expected due to the development traffic. This design will need to be confirmed by further investigations during further phases of the project.

5.3 MITIGATION MEASURES

Due to the impact of heavy goods transport on the affected roads, the following mitigation measures are proposed for the expansion of the quarry:

- It is proposed that only Road W be used as the access route for the site. The elimination of Road B being used as an additional route reduces footprint of impact on the surrounding environment. This measure also reduces the obligation of the developer to implement remedial measures along two routes.
- Road W is a provincial route and it is proposed that it be surfaced and meets the provincial authority's standards for paved roads. The surfaced cross-section is proposed to accommodate two lanes and side drainage, according to provincial standards. The associated pavement structure is to be designed in accordance with the expected traffic along the route. It is proposed that Road W be surfaced from the intersection with the National Route 6 up to the property boundary of the quarry.
- While maintenance of the access routes is not the sole responsibility of the developer, it is proposed that maintenance measures be implemented for Road W to reduce the level of impact of the heavy goods transport on the surrounding environment and transport-related infrastructure. The cost of maintenance of the proposed surfaced road is

considered to be a considerable saving in comparison to the maintenance of the gravel/unsurfaced road infrastructure.

- It is noted that the upgrading to a surfaced road for Road W may not be financially viable at the onset of the expansion of the quarry. It is therefore also proposed that provision be made for the gravel pavement structure of Road W be maintained by the developer by means of regular regravelling (scheduling to be established), vegetation clearance and side drainage clearance until such time that the upgrading of Road W to a paved surface can be financed by the quarry/developer.

CHAPTER 6 RESPONSE TO COMMENTS OF BACKGROUND INFORMATION DOCUMENT

6.1 BACKGROUND INFORMATION DOCUMENT

The background information document (BID) was compiled as part of the Environmental Impact Assessment process for the extension of the quarry. The comment period closed on 13 October 2020. The comments received from the interested and affected parties (I&AP's) have been summarised by the environmental assessment practitioner (EAP). The comments relating to the roads and transport impacts of the development are addressed in this chapter, and reinforced elsewhere in this assessment report.

6.2 COMMENTS RECEIVED

The comments below have been numbered according to the separate comments from various I&AP's received from the EAP.

Table 6-1: Response to comments received from Background Information Document

ITEM	COMMENT RECEIVED	RESPONSE
1.	• Number of trucks, noise, dust, safety – W-road.	• It is proposed that only Road W be used by the quarry and that Road W be upgraded to a surfaced road to mitigate the impact of the heavy vehicles.
2.	• Traffic flow on W-road, speed, safety, noise, business hours. • W-road is private road; servitude use not granted to Quarry	• Speed and safety along Road W would be addressed as part of the design process for upgrading Road W to a paved road. Minimum lane widths with side drainage is proposed. • Road W is indicated as a provincial road, according to the provincial authorities and therefore a public road.
3.	Road condition, haulage vehicles: • State of B-road • Rain washes fill material from the road. • Solution – only drive on W road that is better state and wider.	• While maintenance of the access roads is not the sole responsibility of the developer, it is proposed that only Road W be used by the quarry, with upgrading to sealed road and provision of its maintenance.
4.	W-road on property and still need to sort out surveyor's recommendations. No trucks on W- or C-roads	• As indicated in item 2 above, Road W is indicated as a provincial road, according to the provincial authorities and therefore a public road.
5.	• B-road is a private servitude road. • Trucks on B-road at all hours	• Road B has been indicated by the municipality as a municipal road.

ITEM	COMMENT RECEIVED	RESPONSE
	• B-road condition, safety, speeding, damage of fences, killing pets.	• It is proposed that Road W be the sole access route to the site in order to mitigate the impact of the heavy goods transport.
6.	Traffic impact on W-road, increased traffic on road, speeding, hours of operation, maintenance.	• As indicated in item 2 above, speed and safety along Road W would be addressed as part of the design process for upgrading Road W to a paved road. • As indicated in item 3 above, while maintenance of the access roads is not the sole responsibility of the developer, it is proposed that mitigation measures, including maintenance of Road W, according to provincial requirements, be implemented.
7.	• Increased traffic volumes – B-road • Poor maintenance and upkeep of road • Speeding of trucks	• See item 3 above.
8.	Listed activities note construction of road – show on a plan where	• The Background Information Document indicates road construction as a listed activity. The construction of road may be applicable if Road W is upgraded to a sealed road according to minimum requirements to be set by the provincial authorities.
9.	Speeding, road safety	• See item 2 and 6 above.
10.	• Undertaking required that the W-road will not be used • Wansley holds servitude to use road over his land. • W-road is on private road not a public road • Will physically close the road	• Road W is indicated as a provincial road, according to the provincial authorities and therefore a public road.

ITEM	COMMENT RECEIVED	RESPONSE
11.	• Listed notice reference to roads – explain • Promised road maintained not done • Agreed to water W-road on Mondays, Wednesdays and Fidays not done (2007) • Oil spills from accidents not attended to • Excessive speeds by the cartage drivers on our private road • Reckless driving by the cartage drivers on our private W-road sometimes literally forcing vehicles off the road • High volumes of cartage trucks • Long hours of cartage trucks on the road • Loads are not secured and lost partial loads are not attended to. • When the MR holder does work on the road, they continuously block the under-road drainage pipes to our dam and block the road run-offs to our property. • When the MR holder has idle cartage trucks, they will dump loads of sabunga on the road surface for later use which is a risk to all road users as these dumped loads could lie there for weeks on end. • The deteriorating condition of our roads due to the heavy traffic has a very negative effect on our own vehicles. • Horse riding on our roads has come to an end due to the cartage truck traffic.	• See item 3 and 8 above.
12.	• State of the B-Road • No mining trucks on B-Road	• See item 5 above.
13.	• Destruction of the B-road, speeding. • Suggested only Gonubie trucks on B-road the rest W-road • Discipline and control of drivers, quarry brushes of incidents • Regular maintenance on B-road by quarry	• See item 3 and 5 above.
14.	Degradation of B–road, speeding, no maintenance. Trucks must use W-road	• See item 3 and 5 above.

CHAPTER 7 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

The purpose of this report was to assess the impact of the proposed expansion of the mining footprint at Wansley Quarries on the transportation network. The following conclusion can be drawn from this assessment:

- The quarry currently gains access to the greater road network via Road W, linking to the National Route 6 to the west of the site and Road B, linking to the municipal Class 3 Municipal Main Road, R102, to the south of the site. Road W is classified as a Provincial Minor Road and Road B is classified as a Municipal Road. Both roads are unsurfaced.

- Existing traffic to and from the quarry is estimated to be approximately 100 loads per day, according to the operations manager. This is in line with the 12-hour traffic survey taken on 07 October 2020, at the intersection of Road W and Road B.

- Future traffic generated from the site expansion is estimated to be 200 loads per day. This additional traffic does not affect any peak capacities of the roads or intersections but due to the heavy goods transport generated by the development, the pavement structure of the gravel roads is considered the main impact.

- Initial investigations into the impact of the heavy goods transport reveal that this proposed development would require a surfaced access route (Road W). The surfaced access route would be required to conform to the provincial minimum standards for cross-section.

- As part of the road infrastructure considerations, the expected pavement bearing capacity was investigated as part of this report. It has been estimated that the design pavement class results in an ES3. The associated pavement structure to accommodate this traffic loading will need to be designed in further detail in future phases of this project.

- The expanded mining footprint crosses a portion of the provincial minor road (Road W) that falls on the property. This will require realignment of a portion of the road and the provincial roads department should be informed of such action.

7.2 RECOMMENDATIONS

The following mitigation measures are recommended with regard to the proposed expansion of the mining footprint at Wansley Quarries:

- It is proposed that only Road W be used for access to the quarry. This will mitigate against the negative impact spread over two roads. It would also allow for the improvement and maintenance of only one access road, as opposed to two access roads.

- It is also proposed that the developer surfaces Road W from the intersection with the National Route 6 up to the property boundary of the quarry to minimum cross-sectional standards, as required by the provincial authority. Further investigations and design will be required for the finalisation of the cross-section and pavement structure.

- The developer will be required to maintain the upgraded Road W, according to provincial requirements. This will ensure that the impact of the heavy vehicle transport along the route is mitigated through the operational life of the quarry.

- While the surfacing of Road W is considered the preferred recommendation, it is proposed that the gravel pavement structure of Road W be maintained by means of regular regravelling (scheduling to be established), vegetation clearance and side drainage clearance until such time that the upgrading of Road W to a paved surface becomes financially viable as a result of the quarry operations or within a three year period after commencement of the new activities.

- It is proposed that the necessary communications with the provincial authorities for the realignment of the portion of Road W affected by the expansion of the mining footprint be initiated.

With the implementation of the abovementioned recommendations, the expansion of the mining footprint of Wansley Quarry may be supported from a traffic engineering perspective.

APPENDIX A

FOOTPRINT EXPANSION CO-ORDINATES

BACKGROUND INFORMATION DOCUMENT

SITE DESCRIPTION

Wansley Quarries is located ±30 km north-east of East London city centre and ±65 km south-east of King William's Town. The extent of the proposed extension area is ±37.8575 ha, and the GPS coordinates of the area are as listed below.

GPS COORDINATES OF S102 EXTENSION AREA	
DEGREES MINUTES SECONDS	**DECIMAL DEGREES**
A. 32.54'43.53"S; 27°55'18.20"E	A. -32.912092°S; 27.921722°E
B. 32°54'40.46"S; 27°55'20.88"E	B. -32.911240°S; 27.922466°E
C. 32°54'38.70'S; 27°55'23.42"E	C. -32.910751°S; 27.923173°E
D. 32°54'37.25"S; 27°55'28.39"E	D. -32.910348°S; 27.924552°E
E. 32°54'36.18"S; 27°55'34.28"E	E. -32.910052°S; 27.926190°E
F. 32°54'54.49"S; 27°55'55.51"E	F. -32.915137°S; 27.932086°E
G. 32°54'59.18"S; 27°55'42.07"E	G. -32.916439°S; 27.928354°E
H. 32°54'59.14"S; 27°55'33.87"E	H. -32.916428°S; 27.926074°E

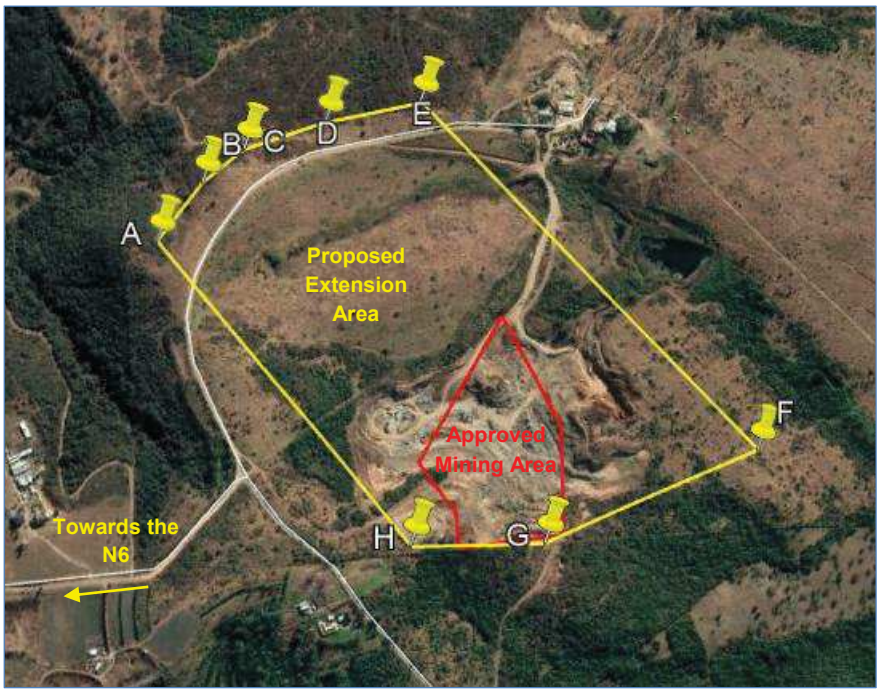


***Figure 1**: Satellite view of the proposed extension area (yellow polygon) in relation to the approved mining footprint (red polygon).*

APPENDIX B

ROAD NETWORK INFORMATION

BUFFALO CITY MUNICIPALITY (BUF)

Project Title: Eastern Cape Roads Asset Management System
Drawing Title: Road Network by Road Category
Drawing Number: Figure 8
File Location: 840/GIS/Road Network by LM - 2018 Nov/
Drawing Date: November 2018

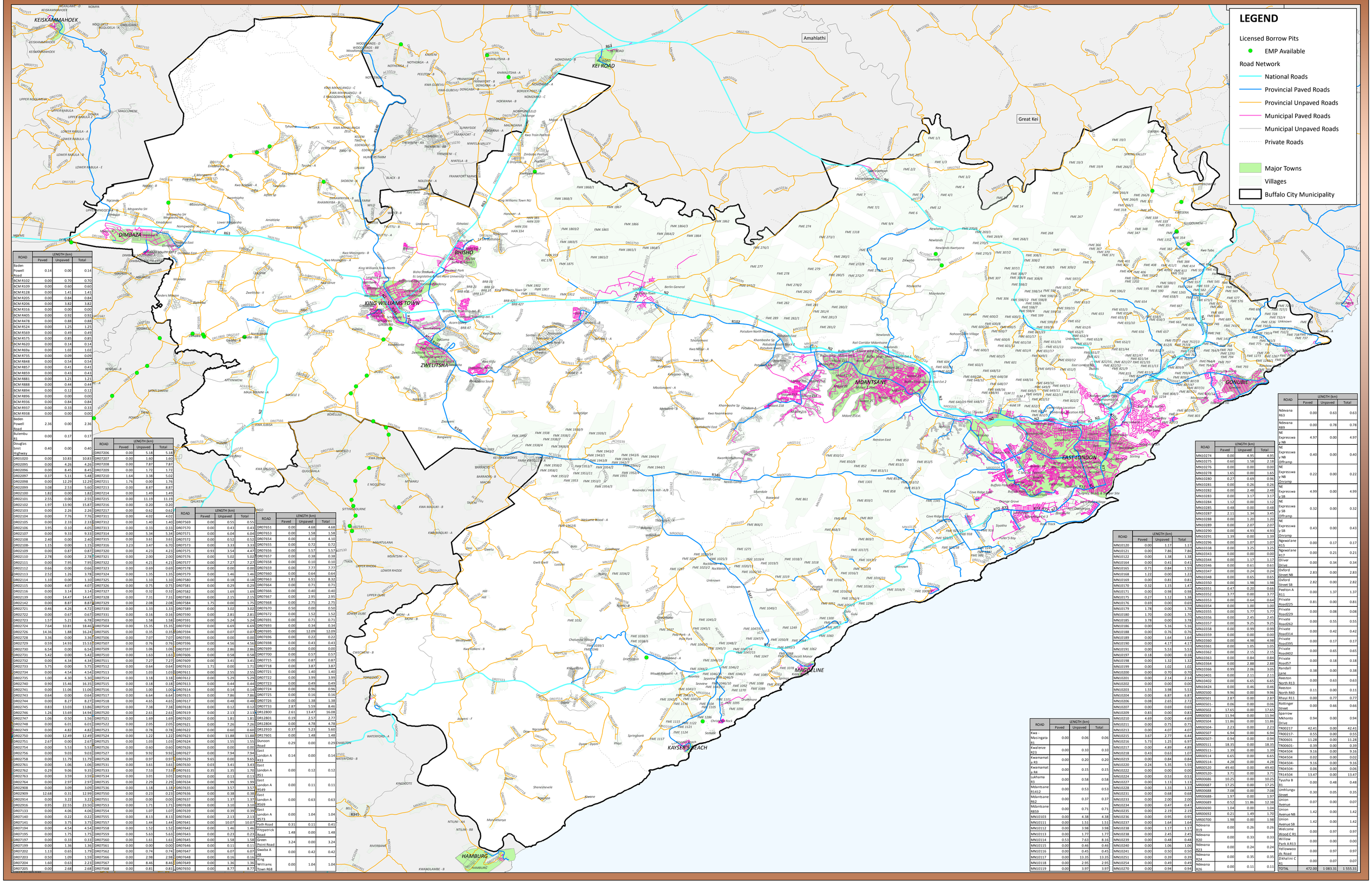
SCALE : USE SCALEBAR

0 1 2 3 4 5 6 7 Kilometers

N W E S

Map Produced By :
Engineering Advice and Services
Tel: (041) 581 2421

Province of the EASTERN CAPE TRANSPORT



ROAD	LENGTH (km)		
	Paved	Unpaved	Total
Baden Powell Road	0.14	0.00	0.14
BCM R102	0.00	0.70	0.70
BCM R109	0.00	0.60	0.60
BCM R128	0.00	1.41	1.41
BCM R205	0.00	0.84	0.84
BCM R206	0.00	3.82	3.82
BCM R316	0.00	0.00	0.00
BCM R405	0.00	0.92	0.92
BCM R478	0.00	0.88	0.88
BCM R524	0.00	1.25	1.25
BCM R569	0.00	0.49	0.49
BCM R575	0.00	0.85	0.85
BCM R620	0.00	0.14	0.14
BCM R69a	0.00	1.02	1.02
BCM R735	0.00	0.09	0.09
BCM R848	0.00	0.54	0.54
BCM R857	0.00	0.41	0.41
BCM R859	0.00	0.43	0.43
BCM R881	0.00	1.21	1.21
BCM R888	0.00	0.44	0.44
BCM R894	0.00	0.12	0.12
BCM R896	0.00	0.00	0.00
BCM R936	0.00	0.84	0.84
BCM R937	0.00	0.33	0.33
BCM R938	0.00	0.00	0.00
Beden Powell Road	2.36	0.00	2.36
Bulembu R1	0.00	0.17	0.17
Douglas Smit Highway	0.40	0.00	0.40
DR01020	0.00	10.83	10.83
DR02095	0.00	4.26	4.26
DR02096	0.00	8.45	8.45
DR02097	0.37	5.11	5.48
DR02098	0.00	12.29	12.29
DR02099	3.08	2.53	5.60
DR02100	1.82	0.00	1.82
DR02101	2.55	0.00	2.55
DR02102	1.97	13.90	15.87
DR02103	0.00	2.26	2.26
DR02104	0.00	7.76	7.76
DR02105	0.00	2.33	2.33
DR02106	3.95	0.10	4.05
DR02107	0.00	9.33	9.33
DR02108	2.40	0.00	2.40
DR02108-	1.15	0.00	1.15
DR02109	0.00	0.87	0.87
DR02110	2.78	0.00	2.78
DR02111	0.00	7.95	7.95
DR02112	0.66	0.00	0.66
DR02113	2.52	1.26	3.78
DR02114	1.10	0.00	1.10
DR02115	0.00	4.07	4.07
DR02116	0.00	3.14	3.14
DR02139	0.00	14.47	14.47
DR02142	0.00	8.87	8.87
DR02721	0.46	4.26	4.72
DR02722	0.00	0.67	0.67
DR02723	1.57	5.21	6.78
DR02724	7.64	10.81	18.45
DR02726	14.36	1.88	16.24
DR02728	3.36	0.00	3.36
DR02729	0.59	14.93	15.53
DR02730	6.54	0.00	6.54
DR02731	5.42	0.00	5.42
DR02732	0.00	4.34	4.34
DR02733	5.75	0.00	5.75
DR02734	0.00	4.54	4.54
DR02735	1.00	4.30	5.30
DR02740	0.90	15.46	16.35
DR02741	0.00	11.06	11.06
DR02743	0.64	0.00	0.64
DR02744	0.00	8.27	8.27
DR02745	0.83	13.03	13.86
DR02746	1.26	13.69	14.94
DR02747	1.06	0.50	1.56
DR02748	0.00	6.01	6.01
DR02749	0.00	4.82	4.82
DR02750	0.00	12.49	12.49
DR02751	2.67	0.00	2.67
DR02754	0.00	5.53	5.53
DR02756	0.00	9.03	9.03
DR02758	0.00	11.79	11.79
DR02761	0.00	1.06	1.06
DR02762	0.29	9.06	9.35
DR02763	0.00	3.59	3.59
DR02764	0.00	2.97	2.97
DR02908	0.00	3.09	3.09
DR02909	12.68	0.31	12.99
DR02914	0.00	3.22	3.22
DR02916	0.95	22.55	23.50
DR07133	0.00	4.06	4.06
DR07140	0.00	0.22	0.22
DR07141	0.00	3.75	3.75
DR07194	0.00	4.54	4.54
DR07195	0.00	1.75	1.75
DR07197	0.00	0.33	0.33
DR07198	0.00	1.36	1.36
DR07202	1.13	0.65	1.79
DR07203	0.50	1.09	1.59
DR07204	1.60	0.63	2.23
DR07205	0.00	2.68	2.68

ROAD	LENGTH (km)		
	Paved	Unpaved	Total
DR07206	0.00	5.18	5.18
DR07207	0.00	1.60	1.60
DR07208	0.00	7.87	7.87
DR07209	0.00	1.72	1.72
DR07210	1.64	3.38	5.02
DR07211	1.76	0.00	1.76
DR07213	0.00	8.87	8.87
DR07214	0.00	1.49	1.49
DR07215	0.00	11.19	11.19
DR07216	0.00	0.20	0.20
DR07217	0.00	0.62	0.62
DR07311	0.00	4.02	4.02
DR07312	0.00	1.40	1.40
DR07313	0.00	0.33	0.33
DR07314	0.00	5.34	5.34
DR07315	0.00	3.61	3.61
DR07316	3.23	3.47	6.70
DR07320	0.00	4.23	4.23
DR07321	2.78	0.00	2.78
DR07322	0.00	4.21	4.21
DR07323	0.00	0.69	0.69
DR07324	0.00	1.35	1.35
DR07325	0.00	1.10	1.10
DR07326	0.00	0.75	0.75
DR07327	0.00	0.32	0.32
DR07328	0.00	7.31	7.31
DR07329	0.00	2.08	2.08
DR07330	0.00	1.33	1.33
DR07331	0.00	0.16	0.16
DR07503	0.00	1.58	1.58
DR07504	0.00	15.35	15.35
DR07505	0.00	0.35	0.35
DR07506	0.00	7.07	7.07
DR07507	0.00	0.76	0.76
DR07509	0.00	1.06	1.06
DR07510	0.00	1.63	1.63
DR07511	0.00	7.27	7.27
DR07512	0.00	0.64	0.64
DR07513	0.00	1.03	1.03
DR07514	0.00	5.29	5.29
DR07515	0.00	0.18	0.18
DR07516	0.00	1.00	1.00
DR07517	0.00	6.64	6.64
DR07518	0.00	4.65	4.65
DR07519	0.00	7.38	7.38
DR07520	0.00	2.61	2.61
DR07521	0.00	1.69	1.69
DR07522	0.00	2.05	2.05
DR07523	0.00	0.78	0.78
DR07524	0.00	1.22	1.22
DR07525	0.00	1.03	1.03
DR07526	0.00	0.60	0.60
DR07527	0.00	9.92	9.92
DR07528	0.00	0.97	0.97
DR07531	0.00	3.61	3.61
DR07533	0.00	7.53	7.53
DR07534	0.00	3.01	3.01
DR07535	0.00	2.29	2.29
DR07536	0.00	1.18	1.18
DR07550	0.00	0.23	0.23
DR07551	0.00	1.37	1.37
DR07553	0.00	1.71	1.71
DR07554	0.00	1.07	1.07
DR07555	0.00	8.13	8.13
DR07557	0.00	1.44	1.44
DR07558	0.00	1.52	1.52
DR07559	0.00	5.63	5.63
DR07560	0.00	1.61	1.61
DR07566	0.00	0.00	0.00
DR07568	0.00	0.74	0.74
DR07566	0.00	2.98	2.98
DR07567	0.00	8.46	8.46
DR07568	0.00	0.81	0.81

ROAD	LENGTH (km)		
	Paved	Unpaved	Total
DR07569	0.00	0.55	0.55
DR07570	0.00	0.43	0.43
DR07571	0.00	6.04	6.04
DR07572	0.00	0.52	0.52
DR07573	0.00	3.33	3.33
DR07575	0.93	3.54	4.47
DR07576	0.00	5.02	5.02
DR07577	0.00	7.27	7.27
DR07578	0.00	0.00	0.00
DR07579	0.00	1.46	1.46
DR07580	0.00	0.18	0.18
DR07581	0.00	0.29	0.29
DR07582	0.00	1.69	1.69
DR07583	0.00	2.15	2.15
DR07584	1.75	0.00	1.75
DR07589	0.00	3.02	3.02
DR07590	0.00	2.81	2.81
DR07591	0.00	5.24	5.24
DR07592	0.00	6.69	6.69
DR07593	0.00	0.07	0.07
DR07595	0.00	0.00	0.00
DR07596	0.00	4.56	4.56
DR07597	0.00	2.86	2.86
DR07700	0.00	0.57	0.57
DR07715	0.00	0.87	0.87
DR07718	0.00	3.87	3.87
DR07721	0.00	1.40	1.40
DR07722	0.00	3.99	3.99
DR07723	0.00	0.49	0.49
DR07724	0.00	0.96	0.96
DR07725	0.00	0.16	0.16
DR07726	0.00	1.38	1.38
DR07733	2.87	5.59	8.46
DR12800	2.61	13.47	16.08
DR12801	0.19	2.57	2.77
DR12804	0.00	4.78	4.78
DR12910	0.37	5.23	5.60
DR17601	0.00	1.48	1.48
Dunoon Road	0.29	0.00	0.29
East London A R33	0.14	0.00	0.14
East London A R51	0.00	0.12	0.12
East London A R549	0.00	0.11	0.11
East London A R569	0.00	0.63	0.63
East London A R573	0.00	1.04	1.04
Fath Road	0.31	0.11	0.41
Fitzpatrick Road	1.48	0.00	1.48
Green Point Road	3.24	0.00	3.24
Gwaba A 58	0.00	0.42	0.42
King Williams Town R68	0.00	1.04	1.04

ROAD	LENGTH (km)		
	Paved	Unpaved	Total
Kwa Masingata R1	0.00	0.06	0.06
Kwalenze R23	0.00	0.10	0.10
Kwamamata R3	0.00	0.20	0.20
Kwamamata R4	0.00	0.15	0.15
Lukhama R3	0.00	0.58	0.58
Mdantsane R1412	0.00	0.53	0.53
Mdantsane R62	0.00	0.37	0.37
Mdantsane R859	0.00	0.71	0.71
MN10103	0.00	4.38	4.38
MN10111	0.00	1.51	1.51
MN10112	0.00	3.98	3.98
MN10113	0.00	1.77	1.77
MN10114	0.53	7.63	8.16
MN10115	0.00	0.46	0.46
MN10116	0.00	0.45	0.45
MN10117	0.00	13.35	13.35
MN10118	0.00	2.95	2.95
MN10119	0.00	3.97	3.97

ROAD	LENGTH (km)		
	Paved	Unpaved	Total
Ndevana R63	0.00	0.63	0.63
Ndevana R89	0.00	0.78	0.78
NE Expressway NB	4.97	0.00	4.97
NE Expressway NB Offramp	0.40	0.00	0.40
NE Expressway NB Onramp	0.22	0.00	0.22
NE Expressway SB	4.99	0.00	4.99
NE Expressway SB Offramp	0.32	0.00	0.32
NE Expressway SB Onramp	0.43	0.00	0.43
Ngwalane R15	0.00	0.17	0.17
Ngwalane R17	0.00	0.21	0.21
Oliver Drive	0.00	0.34	0.34
Oxford Street NB	2.83	0.00	2.83
Oxford Street SB	2.82	0.00	2.82
Peelton A R11	0.00	1.37	1.37
Private Road229	0.81	0.00	0.81
Private Road252	0.08	0.00	0.08
Private Road314	0.00	0.55	0.55
Private Road395	0.00	0.42	0.42
Private Road402	0.00	0.17	0.17
Private Road57	0.00	0.65	0.65
Randall Lane	0.00	0.18	0.18
Reeston North R13	0.38	0.00	0.38
Reeston North R40	0.00	0.63	0.63
Rhayi R11	0.11	0.00	0.11
Rottinger Street	0.00	0.77	0.77
Sparrow Mkhonto Drive	0.00	0.66	0.66
Tyutyu B	0.94	0.00	0.94
Tyutyu R	0.00	0.48	0.48
Umhlungu Street	0.30	0.05	0.35
Union Avenue	0.00	0.07	0.07
Union Avenue NB	1.42	0.00	1.42
Union Avenue SB	1.42	0.00	1.42
Welcome Wood C R1	0.00	0.97	0.97
Willow Park A R13	0.00	0.00	0.00
Yellowwood s Road	0.00	0.97	0.97
Zikhalini C R1	0.00	0.07	0.07
TOTAL	472.00	1 083.31	1 555.31

ROAD	LENGTH (km)		
	Paved	Unpaved	Total
MN10274	0.00	4.95	4.95
MN10275	0.60	1.58	2.18
MN10276	0.00	0.00	0.00
MN10278	1.65	0.00	1.65
MN10280	0.27	0.69	0.96
MN10281	0.00	0.26	0.26
MN10282	0.00	2.48	2.48
MN10283	0.00	3.17	3.17
MN10284	1.12	0.00	1.12
MN10285	0.48	0.00	0.48
MN10287	2.11	1.34	3.45
MN10288	0.00	1.20	1.20
MN10289	0.00	2.07	2.07
MN10290	0.00	4.93	4.93
MN10291	1.39	0.00	1.39
MN10296	0.00	1.07	1.07
MN10338	0.00	3.25	3.25
MN10343	0.00	0.00	0.00
MN10344	0.00	1.17	1.17
MN10346	0.00	0.61	0.61
MN10347	0.00	0.24	0.24
MN10348	0.00	0.65	0.65
MN10350	0.00	1.98	1.98
MN10351	0.47	0.20	0.66
MN10352	3.77	0.00	3.77
MN10353	0.00	0.64	0.64
MN10354	0.00	1.00	1.00
MN10355	0.00	5.77	5.77
MN10356	0.00	2.45	2.45
MN10357	0.00	9.25	9.25
MN10358	0.00	0.99	0.99
MN10359	0.00	0.00	0.00
MN10360	0.00	4.98	4.98
MN10361	0.00	1.05	1.05
MN10362	0.00	2.15	2.15
MN10363	0.00	0.84	0.84
MN10364	0.00	2.88	2.88
MN10366	0.99	2.06	3.05
MN10401	0.00	2.11	2.11
MN10402	0.00	6.65	6.65
MN10424	0.00	0.46	0.46
MN00500	9.96	0.00	9.96
MR00501	2.87	0.00	2.87
MR00501-	0.06	0.00	0.06
MR00502	17.65	0.00	17.65
MR00503	11.94	0.00	11.94
MR00504	11.86	0.00	11.86
MR00504-	2.23	0.00	2.23
MR00507	6.94	0.00	6.94
MR00507-	0.94	0.00	0.94
MR00511	18.35	0.00	18.35
MR00511-	1.39	0.00	1.39
MR04504	9.16	0.00	9.16
MR04504-	4.28	0.00	4.28
MR00520	49.40	0.00	49.40
MR00520-	3.71	0.00	3.71
MR00686	10.25	0.00	10.25
MR00687	17.25	0.00	17.25
MR00688	7.08	0.00	7.08
MR00688-	1.97	0.00	1.97
MR00689	0.52	11.86	12.38
MR00690	1.04	0.00	1.04
MR00692	0.21	1.49	1.70
MR00700	1.98	0.00	1.98
Ndevana R19	0.00	0.26	0.26
Ndevana R20	0.00	0.33	0.33
Ndevana R23	0.00	0.24	0.24
Ndevana R24	0.00	0.35	0.35
Ndevana R26	0.00	0.11	0.11
TR14504	13.47	0.00	13.47
TR04504	9.16	0.00	9.16
TR00601	11.28	0.00	11.28
TR00601-	0.39	0.00	0.39
TR04504	9.16	0.00	9.16
TR04504-	0.06	0.00	0.06
TR00217	0.55	0.00	0.55
TR00217-	0.48	0.00	0.48
MR00501	42.41	0.00	42.41
MR00217	4.89	0.00	4.89
MR00218	0.43	0.63	1.07
MR01219	0.00	0.84	0.84
MR01220	0.24	5.35	5.59
MR01222	0.00	0.00	0.00
MR01224	0.00	0.53	0.53
MR01227	0.00	1.13	1.13
MR01228	0.00	1.33	1.33
MR01231	0.00	0.68	0.68
MR01233	0.00	2.00	2.00
MR01234	0.00	0.47	0.47
MR01235	0.00	2.19	2.19
MR01236	0.00	0.95	0.95
MR01237	0.00	1.64	1.64
MR01238	0.00	1.17	1.17
MR01238	0.00	2.45	2.45
MR01239	0.00	0.48	0.48
MR01240	0.00	1.06	1.06
MR01241	0.00	0.50	0.50
MR01251	0.00	0.39	0.39
MR01254	0.00	0.49	0.49
MR01270	0.00	0.94	0.94

APPENDIX C

12-HOUR TRAFFIC SURVEY DATA

MOVEMENT		From Road W - Right Turn			From Road W - Left Turn			From Quarry Rd - Right Turn			From Quarry Rd - Through			From Road B - Through			From Road B - Left Turn			INTERSECTION TOTALS		
TIME (15min int)																						
FROM	TO	LIGHT	HEAVY	TOTAL	LIGHT	HEAVY	TOTAL	LIGHT	HEAVY	TOTAL	LIGHT	HEAVY	TOTAL	LIGHT	HEAVY	TOTAL	LIGHT	HEAVY	TOTAL	LIGHT	HEAVY	TOTAL
06:00	06:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15	06:30	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	2	0	2
06:30	06:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45	07:00	1	0	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	3	0	3
07:00	07:15	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	3	0	3
07:15	07:30	2	0	2	0	1	1	0	0	0	0	0	0	2	0	2	2	0	2	6	1	7
07:30	07:45	2	0	2	0	0	0	0	0	0	2	1	3	1	0	1	0	0	0	5	1	6
07:45	08:00	0	0	0	1	2	3	1	2	3	1	0	1	1	0	1	0	0	0	4	4	8
08:00	08:15	1	0	1	0	2	2	0	0	0	0	1	1	0	0	0	0	0	0	1	3	4
08:15	08:30	2	0	2	0	2	2	0	1	1	0	0	0	0	0	0	0	0	0	2	3	5
08:30	08:45	1	0	1	0	3	3	0	1	1	0	0	0	0	0	0	0	0	0	1	4	5
08:45	09:00	1	0	1	2	0	2	0	2	2	1	0	1	0	0	0	0	0	0	4	2	6
09:00	09:15	1	0	1	0	1	1	0	3	3	0	1	1	0	1	1	0	0	0	1	6	7
09:15	09:30	3	0	3	2	1	3	0	1	1	0	1	1	1	0	1	0	0	0	6	3	9
09:30	09:45	1	0	1	1	1	2	2	1	3	1	1	2	1	0	1	3	0	3	9	3	12
09:45	10:00	2	0	2	0	1	1	1	1	2	0	0	0	1	1	2	2	0	2	6	3	9
10:00	10:15	1	0	1	0	3	3	1	0	1	0	0	0	0	3	3	1	0	1	3	6	9
10:15	10:30	1	0	1	0	1	1	0	1	1	1	1	2	0	0	0	1	0	1	3	3	6
10:30	10:45	0	0	0	0	3	3	0	1	1	1	2	3	0	0	0	1	0	1	2	6	8
10:45	11:00	0	0	0	0	3	3	0	2	2	1	1	2	1	0	1	2	0	2	4	6	10
11:00	11:15	0	0	0	0	0	0	1	2	3	0	0	0	0	0	0	0	0	0	1	2	3
11:15	11:30	0	0	0	0	4	4	0	1	1	1	1	2	1	2	3	0	0	0	2	8	10
11:30	11:45	0	0	0	0	2	2	0	3	3	1	0	1	2	0	2	1	0	1	4	5	9
11:45	12:00	0	0	0	1	0	1	0	0	0	0	1	1	0	1	1	0	0	0	1	2	3
12:00	12:15	0	0	0	0	2	2	0	1	1	1	0	1	0	0	0	0	0	0	1	3	4
12:15	12:30	0	0	0	0	2	2	1	3	4	0	2	2	0	0	0	0	0	0	1	7	8
12:30	12:45	0	0	0	0	1	1	0	3	3	0	0	0	0	1	1	3	0	3	3	5	8
12:45	13:00	0	0	0	0	2	2	0	4	4	1	0	1	0	0	0	0	0	0	1	6	7
13:00	13:15	1	0	1	3	0	3	0	2	2	1	1	2	2	0	2	2	0	2	9	3	12
13:15	13:30	1	0	1	0	0	0	2	1	3	1	0	1	0	0	0	0	0	0	4	1	5
13:30	13:45	0	0	0	0	2	2	2	0	2	1	0	1	2	0	2	0	0	0	5	2	7
13:45	14:00	0	0	0	0	3	3	0	0	0	0	0	0	0	1	1	1	0	1	1	4	5
14:00	14:15	1	0	1	0	4	4	0	4	4	0	0	0	1	0	1	1	0	1	3	8	11
14:15	14:30	0	0	0	0	3	3	0	3	3	0	0	0	0	1	1	1	0	1	1	7	8
14:30	14:45	0	0	0	0	3	3	0	3	3	1	0	1	0	0	0	0	0	0	1	6	7
14:45	15:00	0	0	0	1	2	3	0	2	2	0	1	1	1	1	2	1	0	1	3	6	9
15:00	15:15	1	0	1	0	3	3	0	4	4	0	0	0	0	0	0	1	0	1	2	7	9
15:15	15:30	1	0	1	0	3	3	0	3	3	1	1	2	0	0	0	1	0	1	3	7	10
15:30	15:45	1	0	1	1	2	3	1	1	2	1	0	1	0	0	0	0	0	0	4	3	7
15:45	16:00	1	0	1	0	2	2	0	1	1	0	0	0	0	0	0	1	0	1	2	3	5
16:00	16:15	0	0	0	0	1	1	0	1	1	0	0	0	1	0	1	0	0	0	1	2	3
16:15	16:30	3	0	3	0	3	3	0	2	2	0	0	0	1	0	1	1	0	1	5	5	10
16:30	16:45	1	0	1	0	1	1	0	3	3	0	1	1	0	0	0	1	0	1	2	5	7
16:45	17:00	2	0	2	1	0	1	0	3	3	1	1	2	0	1	1	1	0	1	5	5	10
17:00	17:15	1	0	1	0	3	3	0	0	0	0	0	0	0	0	0	3	0	3	4	3	7
17:15	17:30	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	2	0	2
17:30	17:45	4	0	4	2	0	2	1	0	1	2	1	3	0	0	0	2	0	2	11	1	12
17:45	18:00	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	3	0	3	4	0	4
		38	**0**	**38**	**18**	**72**	**90**	**16**	**66**	**82**	**22**	**19**	**41**	**20**	**13**	**33**	**37**	**0**	**37**	**151**	**170**	**321**