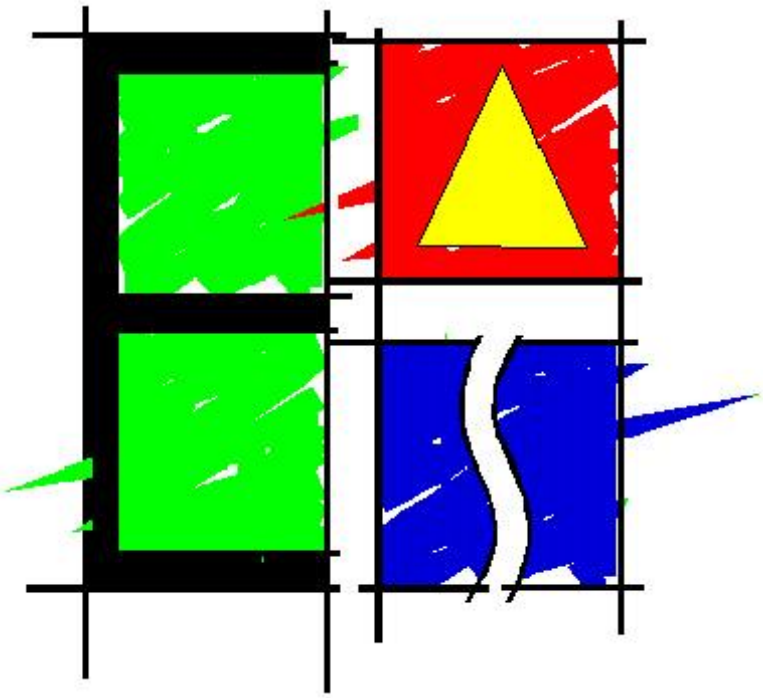
TRAFFIC IMPACT ASSESSMENT

FOR THE PROPOSED DEVELOPMENT OF FOXWOOD DAM, ADELAIDE, NXUBA LOCAL MUNICIPALITY



July 2015

Prepared for: **Nemai Consulting**

Prepared by: **Engineering Advice and Services (Pty) Ltd**
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Cary Hastie Pr Tech Eng

Cary Hastie is a specialist in Traffic Engineering and Transportation Planning.

Cary joined the Port Elizabeth Municipality City Engineers Department in 2004 and studied at the Port Elizabeth Technikon, graduating with a National Higher Diploma in Civil Engineering in 1987 and a Master's Diploma in Civil Engineering (Transportation) in 1990.

Cary spent twenty years with the Nelson Mandela Metropolitan Municipality, involved with traffic engineering and transportation planning matters. He was solely responsible for liaison with public transport operators through the municipal Taxi Liaison Committee and the Port Elizabeth and Uitenhage Taxi Owners Forum and managed a wide variety of projects including public transport planning, transportation planning, traffic signal design and traffic engineering. Cary also has extensive experience in traffic management projects having served as assistant manager of the NMMM's Urban Traffic Control System and being responsible for the design and implementation of various traffic engineering / management projects.

Cary joined Engineering Advice and Services in April 2004 and has since been involved in a large variety of transportation planning, traffic engineering, road safety audit, geometric design and road traffic signage projects.

Among these projects are over 250 traffic impact assessments for a wide variety of clients and covering a wide variety of developments.

Cary is registered as a professional technologist with the Engineering Council of South Africa since 2000.

Cary is married to Sharnell and has a daughter 22 and a son 18.

Jared Charlton – Candidate technician

Jared Charlton is a technician specialising in traffic and transportation. Jared attended the Nelson Mandela Metropolitan University graduating with a National Diploma in Civil Engineering in 2011 and completing a B. Tech degree in Transportation Engineering in 2013.

Jared is registered as a Candidate Technician with the Engineering Council of South Africa.

Jared joined Engineering Advice and Services in 2010 and has been involved in a wide variety of projects necessary for registration as a professional with ECSA.

Projects include fourteen traffic impact assessments, traffic signal investigations, road safety audits, road sign assessments and design, as well as Assistant Resident Engineer on road maintenance and construction projects.

Jared is married to Tammy.

DECLARATION OF INDEPENDENCE

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ABBREVIATIONS

ADT	Average Daily Traffic
ADTT	Average Daily Truck Traffic
COTO	Committee of Transport Officials
DITP	District Integrated Transport Plan
DRPW	Eastern Cape Department of Roads and Public Works
ECDoT	Eastern Cape Department of Transport
IDP	Integrated Development Plan
RTA	Road Traffic Act
SANRAL	South African National Roads Agency SOC Limited
SDF	Spatial Development Framework

1. INTRODUCTION

1.1 BACKGROUND

Engineering Advice & Services (Pty) Ltd was appointed by Nemai Consulting during May 2015 to conduct a traffic impact assessment for the proposed Foxwood Dam on the Koonap River northwest of Adelaide in the Eastern Cape.

The TIA will serve as a specialist study as input into the Environmental Impact Assessment currently being conducted by Nemai Consulting on behalf of the Department of Water and Sanitation.

1.2 TERMS OF REFERENCE

The terms of reference as supplied by the client are as follows:

- Assess the relocation of roads affected by the dam basin.
- Desktop and field study to understand regional and local traffic situation. Undertake traffic survey.
- The relocation of the MR00639 may not be justified, as it will be very expensive and is not often used. The specialist will need to conduct traffic counts and provide a specialist opinion on the need to relocate this road.
- Assess impacts and suggest suitable management measures to prevent or reduce traffic impacts associated with the project, taking into consideration the following –
  - During the construction period there will be an increase in traffic on the local road network due to the delivery of plant and material, transportation of staff and normal construction-related traffic.
  - Haul roads and access roads will be created on site, within the construction domain.
  - As part of the construction phase measures will be implemented for the selective upgrade of the roads (if necessary) and to render these roads safe for other users (amongst others).
  - After the construction phase the local roads will only need to be used for operation and maintenance purposes.
- Assess traffic impacts on a desktop level associated with the hauling of aggregate from a commercial source that is located 6 km to the south of Adelaide (site location to be provided). Suggest best route(s) and suitable mitigation measures.
- Recommend monitoring programme for traffic management, which primarily focuses on the construction phase.
- Consider the following guidelines/Information sources (amongst others):
  - Manual of Traffic Impact Studies (RR93/635) published by the Department of Transport in 1995.
- The study will need to be conducted so as to satisfy the requirements of the ECDRPW.
- Make recommendations on preferred options for the project infrastructure from a traffic impact perspective.
- Provide input into responses to comments received from I&APs, where necessary.

1.2 METHODOLOGY

The approach followed in conducting the traffic impact assessment was in accordance with the guidelines contained in **TMH 16 Volume 1- South African Traffic Impact and Site Assessment Manual** [(1)]. This document is an update of the Manual of Traffic Impact Studies (RR93/635).

The study consisted of two phases, namely:

- Conducting traffic surveys and preparing an opinion on the need to relocate MR00639, and
- Assessing the identified impacts of the proposed dam on the road network and traffic operations and compiling a draft report.

The methodology used was as follows:

Phase 1: Need to Relocate MR00639

- 12-hour classified intersection turning movement counts were conducted at affected intersections in the vicinity of the proposed dam to gain an understanding of current traffic patterns on roads affected by the proposed dam;
- Origin-destination counts (number-plate surveys) were conducted at either end of MR00639 to gain an understanding of current daily usage of MR00639;
- Based on the above surveys, an analysis of traffic movements was conducted and conclusions reached on the need to relocate MR00639.

Phase 2: Impact of Proposed Dam on Road Network and Traffic Operations

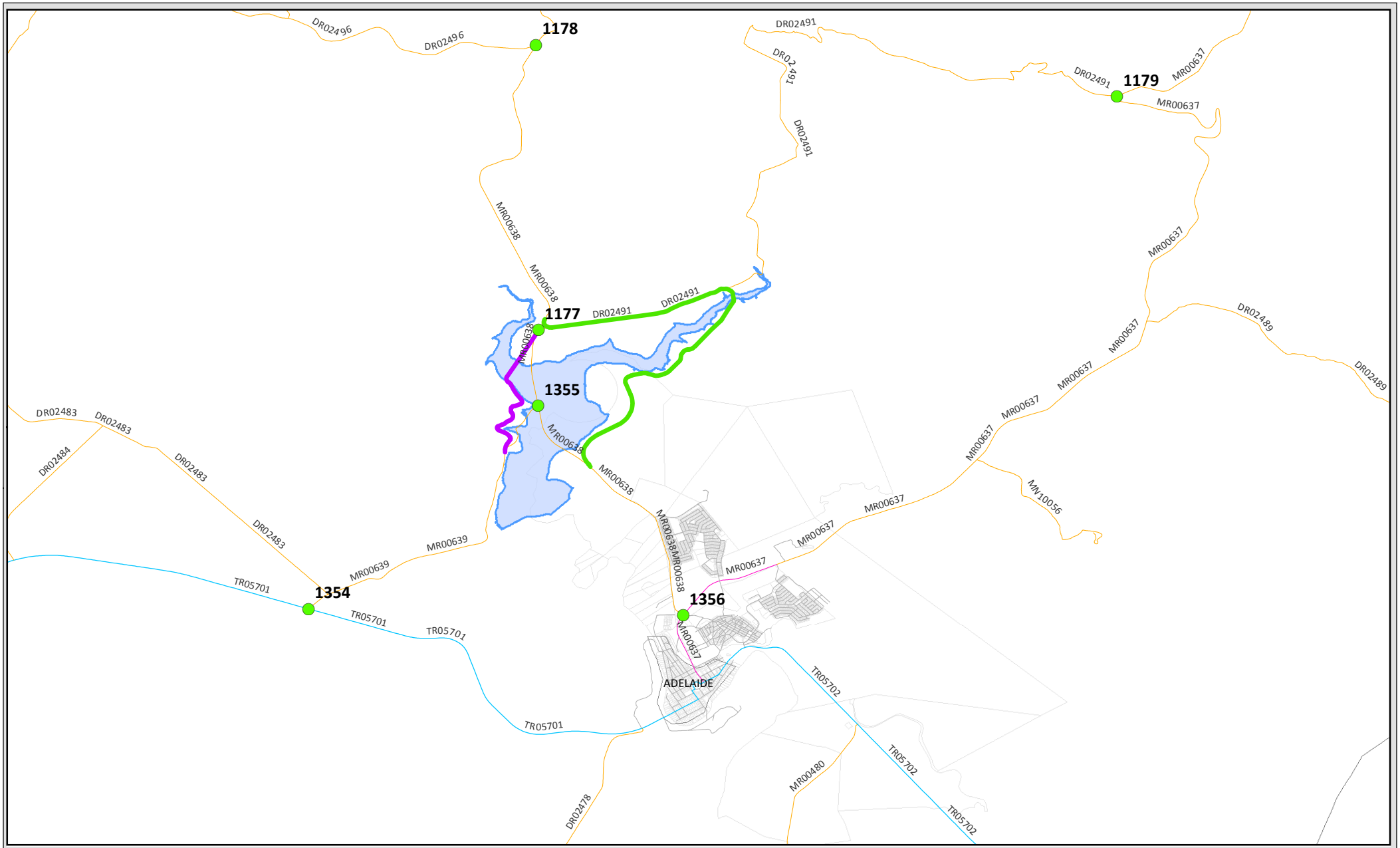
- A desktop study, including a review of the Amathole District Integrated Transport Plan [(2)] and Nxuba Spatial Development Framework [(3)] was conducted to gain an understanding of the local and regional road network and traffic operations;
- 12-hour classified intersection turning movement counts were conducted at affected intersections in the vicinity of the proposed dam to gain an understanding of current traffic patterns on roads affected by the proposed dam;
- A site visit to verify the condition of existing roads to be used for the future R344 realignment and proposed routes to be used as haul roads was conducted;
- An analysis of traffic movements was conducted to determine the impact of the closure (MR00639) and relocation of roads (MR00638 – R344) affected by the proposed dam basin;
- The impact of traffic associated with the construction of the proposed dam on the road network, including haulage of dam building material from quarry sites in the area, from both an operational and traffic safety perspective was assessed;
- Routes for hauling dam building materials were assessed and the most suitable routes in terms of impact on road users and residents in the area were identified with necessary mitigation measures;
- Potential impacts were assessed in terms of operation, traffic safety and road condition for both construction and operational phases of the development, making use of the supplied **Evaluation Method for Environmental Impacts** [(4)];
- Measures to mitigate against the impact of construction traffic including a suitable traffic monitoring programme were identified and recommended;
- By taking into account the major findings of the study, conclusions were made regarding the financial responsibilities of the affected parties for the required road upgrading/management measures.

1.3 STUDY AREA

The study area includes the following roads and intersections that would be affected by the proposed Foxwood Dam:

- R63 from MR00639 junction to the west and the MR00480 junction to the east of Adelaide;
- MR00639 along full length;
- MR00638 from Adelaide to DR02496 junction;
- MR00637 from Adelaide to MR00638 junction;
- DR02491 from MR00638 to proposed new R344 alignment; and
- MR00637 / DR02491 junction.

These roads and intersections are indicated on **Figure 1** overleaf**.**



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- Counting Stations
- Proposed R344 Diversion
- Proposed MR00639 Diversion
- Proposed Foxwood Dam

Project Title: TIA - Proposed Foxwood Dam	*Drawing No:* 1204-P-001
Drawing Title: Figure 1: Locality Plan	*Drawing Date:* May 2015
	Scale 1:100 000
	Prepared by : JC
	Checked by : CH

2. THE PROJECT AND ENVIRONS

2.1 EXTENT OF THE PROPOSED DAM

The **Feasibility Study for Foxwood Dam – Inception Report** [(5)] indicates that the Foxwood Dam is proposed on the Koonap River north of Adelaide to provide potable and irrigation water for the town of Adelaide.

The area that is anticipated to be inundated is estimated to be in the order of 454 hectares.

The extent of the proposed Foxwood Dam is indicated on **Figure 1**.

2.2 AFFECTED ROAD NETWORK

The proposed dam is anticipated to inundate a portion of MR00639 approximately 1km in length from the junction with R344 southwards as well as a portion of MR00638 (R344) measuring approximately 2km.

It is proposed that MR00638 (R344) be rerouted to the east of the proposed dam along the alignment of an existing farm access road south of the Koonap River before crossing the river via a small bridge structure and then following DR02491 west back to MR00638.

MR00639 would need to be rerouted along the escarpment west of the proposed dam crossing a minor tributary of the Koonap River via a bridge structure and then meeting up with the R344 just south of its intersection with DR02491.

The proposed deviations of MR00638 and MR00639 are indicated on **Figure 1**.

3. DATA COLLECTION

3.1 RECENT STUDIES AND INVESTIGATIONS

3.1.1 Amathole District ITP

The Amathole DITP was partly updated during 2012. The update focussed mainly on the public transport status quo and an updated Needs Assessment. The majority of public transport operations outside of the town are along the R63, which has also been identified as a corridor for development and related investment initiatives in the corridor programme driven by ASPIRE (Amathole Development Agency).

Very little attention is focussed on the R344 north of Adelaide presumably because of its status as a gravel road and its passing through a conservation area.

It is noted however that the R344 provides a direct link to Tarkastad from the R63 and provides access to tourist facilities in the Swartberg mountains.

3.1.2 Nxuba SDF

The Nxuba LSDF was reviewed during 2011.

Adelaide is the Urban Service Centre in the Nxuba Municipality. An efficient transport network is also seen as a fundamental link between biodiversity areas, agricultural zones and settlement corridors. In this regard, the LSDF notes that the R344, as an important link between Tarkastad in the north and Grahamstown in the south is seen as a structuring element informing the conceptual framework for the Nxuba Municipality. The area to the north of Adelaide is characterised as primarily game farming and conservation use.
The SDF and IDP consultation processes have identified the upgrade of the R344 between Adelaide and farms to the north of Adelaide as a key project.

3.2 ROAD NETWORK

TR05701 (R63) is a national road linking Calvinia in the Western Cape with the N2 west of Komga in the Eastern Cape, via, Graaff-Reinet, Somerset East, Bedford, Adelaide, Fort Beaufort and King Williams Town. The R63 is a surfaced road which functions as important east-west route between the Western Cape and Eastern Cape.

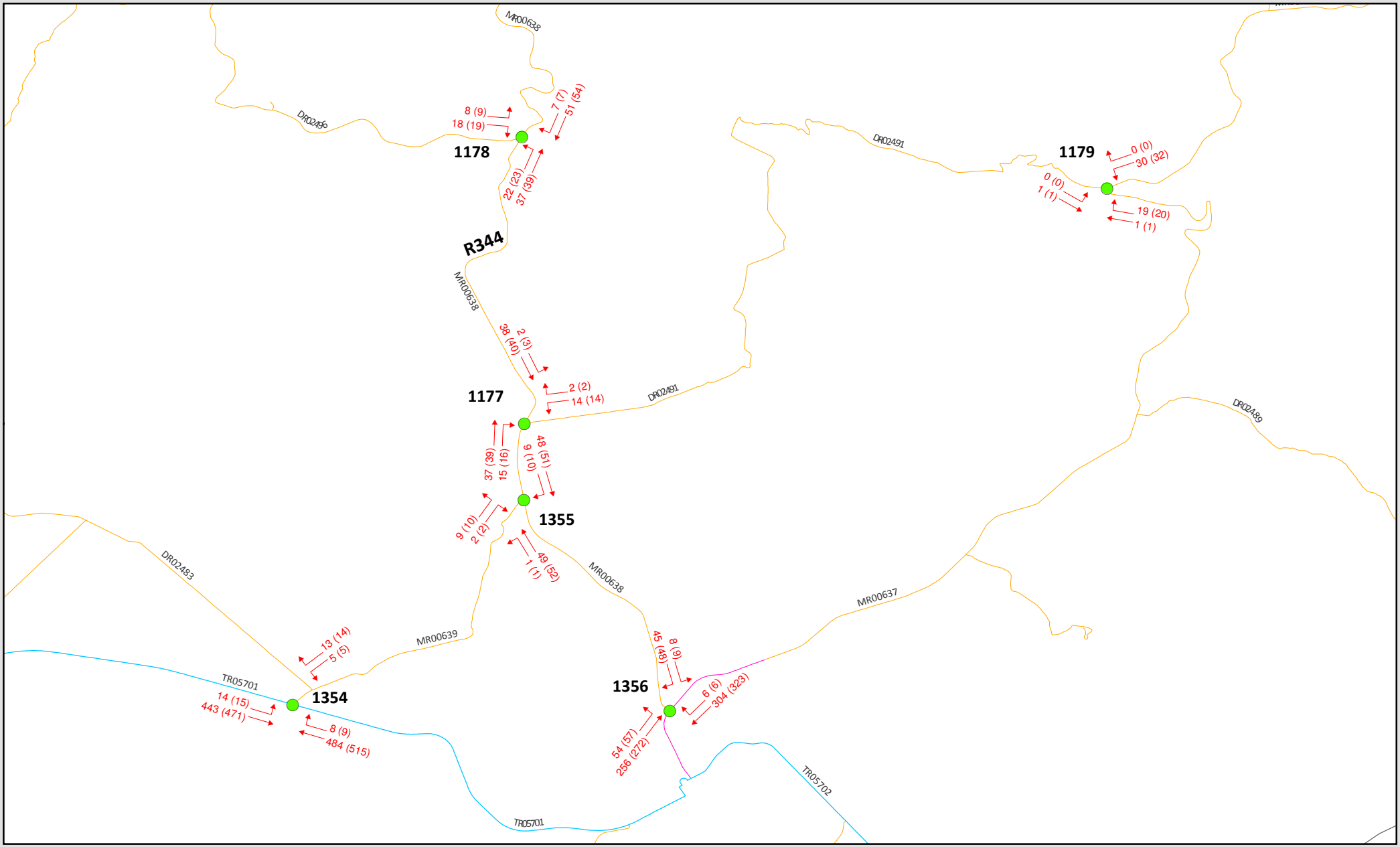
MR00638 (R344) is a district provincial gravel road linking Grahamstown (via the R350) in the south with Dordrecht in the north, via Adelaide, Tarkastad and Sterkstroom. The R344 is a gravel road with almost the entire length between Adelaide and Tarkastad passing through the Smaldeel Conservancy area.

MR00639 is a provincial gravel road approximately 6.3km in length linking TR05701 (R63) in the south with MR00638 (R344) in the north, to the west of Adelaide. The road permits motorists who wish to travel between the R63 and R344 to bypass Adelaide, with a saving in distance travelled of approximately 8.4 km per direction

3.3 CLASSIFIED TRAFFIC VOLUMES

Traffic volumes were conducted over 12-hour periods between 06:00 and 18:00 on Monday 11 May 2014 at six junctions in the vicinity of the proposed dam including the R344 and R63 junctions with MR00639.

The locations of the traffic survey stations and the surveyed volumes are indicated on **Figure 2** overleaf and the data sheets attached as **Annexure A**.



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Counting Stations

Proposed R344 Diversion

Proposed MR00639 Diversion

Proposed Foxwood Dam

256 (272) - 12 hour (ADT)

Project Title:	TIA - Proposed Foxwood Dam
Drawing No:	1204-P-002
Drawing Title:	Figure 2: Count Stations and Traffic Volumes
Drawing Date:	June 2015

0 250500 1 000 1 500 Meters

Scale 1:100 000

Prepared by : JC

Checked by : CH

3.4 ORIGIN-DESTINATION SURVEYS

Origins and destinations of vehicles entering and exiting MR00639 were determined by recording vehicle registration number plates at both the R63 and R344 junctions with MR00639. The results of these surveys, attached as **Annexure B** and summarised on **Figure 3** are analysed in further detail in **Chapter 4.2**.

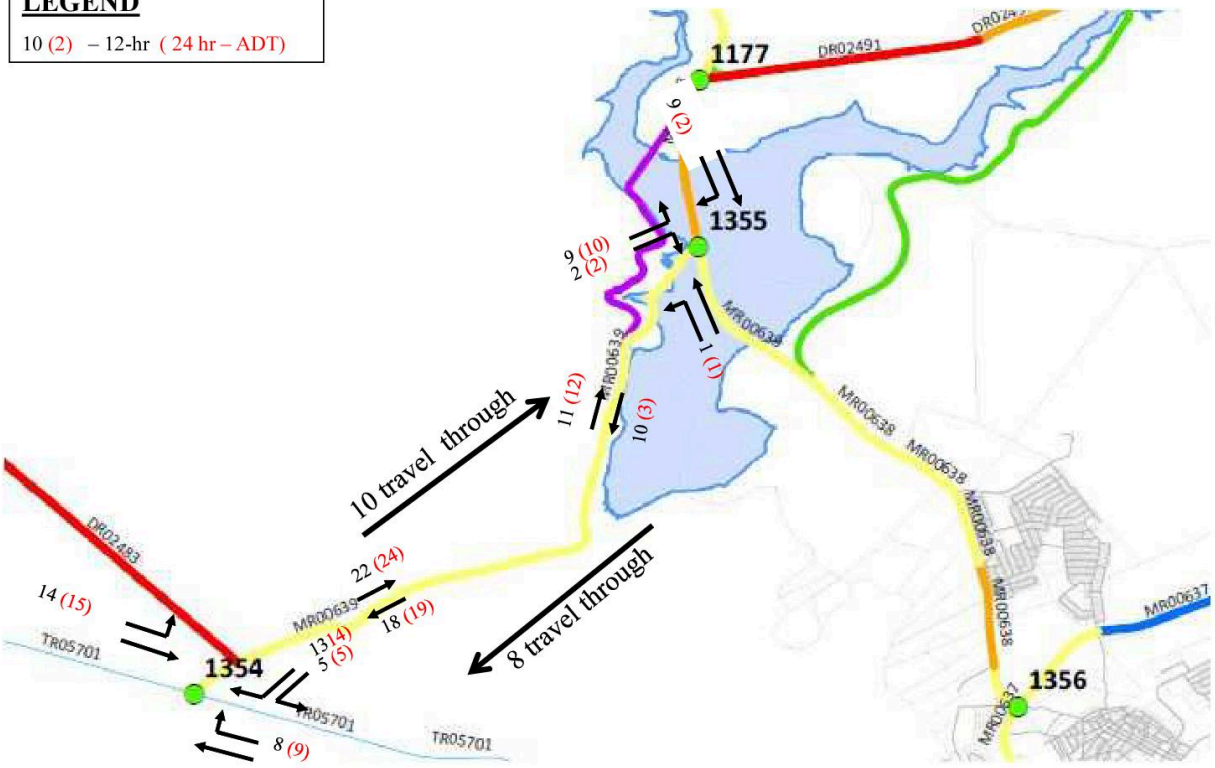


Figure 3: Origin-Destination Survey

3.5 DAILY TRAFFIC VOLUMES

In order to assess the impact of the construction of the dam on the rationalised road network at the date of implementation, assumed to be approximately 2025, current and historical daily traffic volume data was sourced from various fixed count stations in and around Adelaide. These stations are managed by SANRAL and the Eastern Cape Department of Transport.

The data attached as **Annexure C** and summarised in **Table 1** below, indicates that the average traffic growth per annum on the R63east and west of Adelaide is 1.1%, while growth on the R344 north of Adelaide is 0.48% per annum. The average growth per annum across all three stations is 0.89% per annum.

Table 1: ADT and Annual Growth Rates

Station	Description	Authority	2007	2013	% total growth	% p.a.
00622	R63 - Adelaide West	ECDOT	1035	1059	2.32	0.38
00633	R344 – Adelaide North	ECDOT	1281	1318	2.89	0.48
00644	R63 - Adelaide East	ECDOT	1007	1122	11.42	1.82
All					Average	0.89

Source: ECDOT

As such it is proposed that background traffic be escalated by 1% per annum. The current 2015 surveyed volumes were thus escalated by 1% per annum to reflect traffic volumes in 2025.

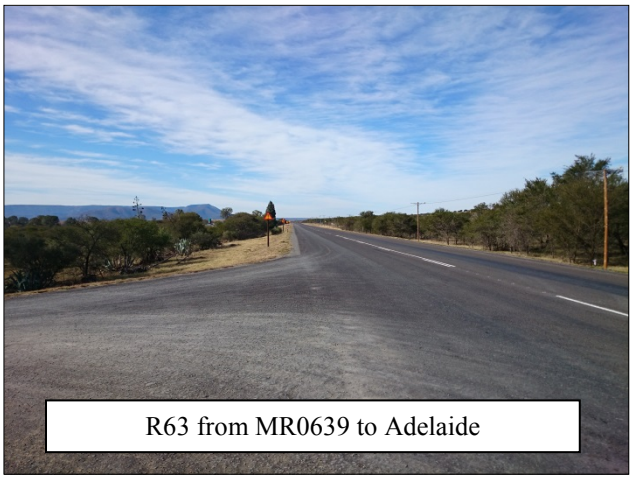
3.6 ROAD NETWORK CONDITION

Road condition assessments of the provincial and municipal roads that would be used by vehicles transporting material for the construction of the dam as well as accommodating reassigned road network traffic in the vicinity of the dam were sourced from the Rural Road Asset Management System currently being coordinated by Engineering Advice and Services on behalf of the Eastern Cape Department of Roads and Public Works, in order to document the current condition of these roads. Note that no condition assessment for the R63 is available. However, the author provided a subjective assessment of the affected portion of the route.

The visual condition assessment results for these roads are graphically indicated on **Figures 4** and **5** overleaf, and are discussed briefly below.

3.6.1 National Roads - R63

The R63 is currently in a fair condition on the approaches to Adelaide.



R63 from MR0639 to Adelaide

3.5.2 Provincial Roads

Apart from the R63, all other roads around Adelaide are provincial roads. The roads are also all gravel roads apart from 3.28km of MR637 from the R63 in the town centre to a point north of Adelaide.

2.2km of the surfaced road is in a fair condition with the remaining 1km in good condition.

Approximately 64% of the gravel roads are in a poor to very poor condition, with the remainder in a fair condition.

MR0639 along its entire length and the majority of MR0638 between Adelaide and DR02491 is in a fair condition.

It is noted that DR02491 along which MR0638 traffic will be rerouted, is in a poor and very poor condition.

R344 from MR0639 to Adelaide

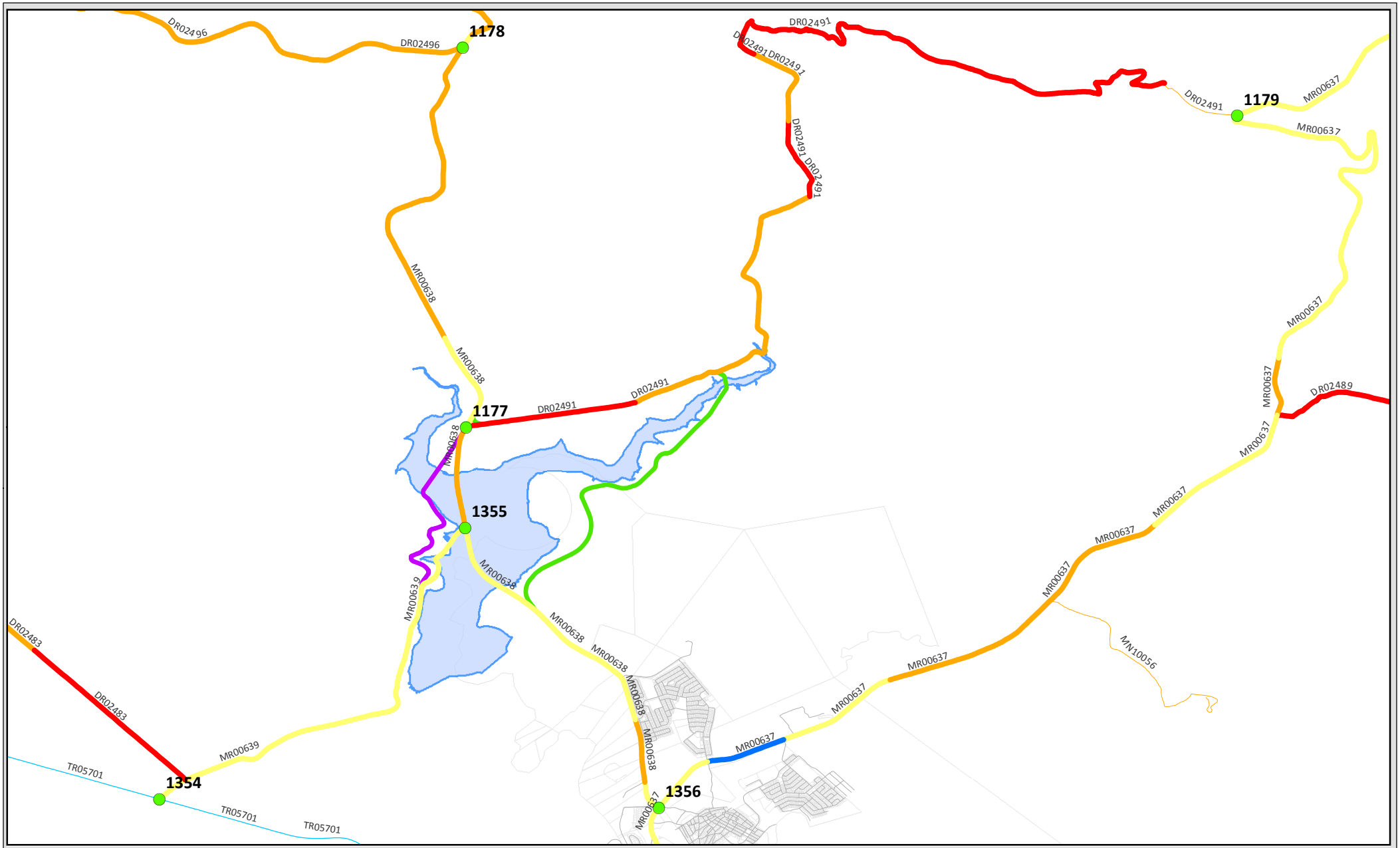
3.5.3 Municipal Roads

Approximately 88% of the unsurfaced municipal roads are in a poor to very poor condition, with a further 12% in a fair condition.

Of the surfaced road network, 32% is in a fair condition, less than 1% in a good condition and the remaining 67% is in poor or very poor condition.

DR02491 from MR0638 to northeast

The road condition situation indicates that construction traffic is more than likely to have a negative impact on the road network. Suitable routes will need to be identified such that the network is not unnecessarily affected, particularly with regard to municipal roads.



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Counting Stations
Proposed R344 Diversion
Proposed MR00639 Diversion
Proposed Foxwood Dam
Visual Conditions
Very Good
Good
Fair
Poor
Very Poor

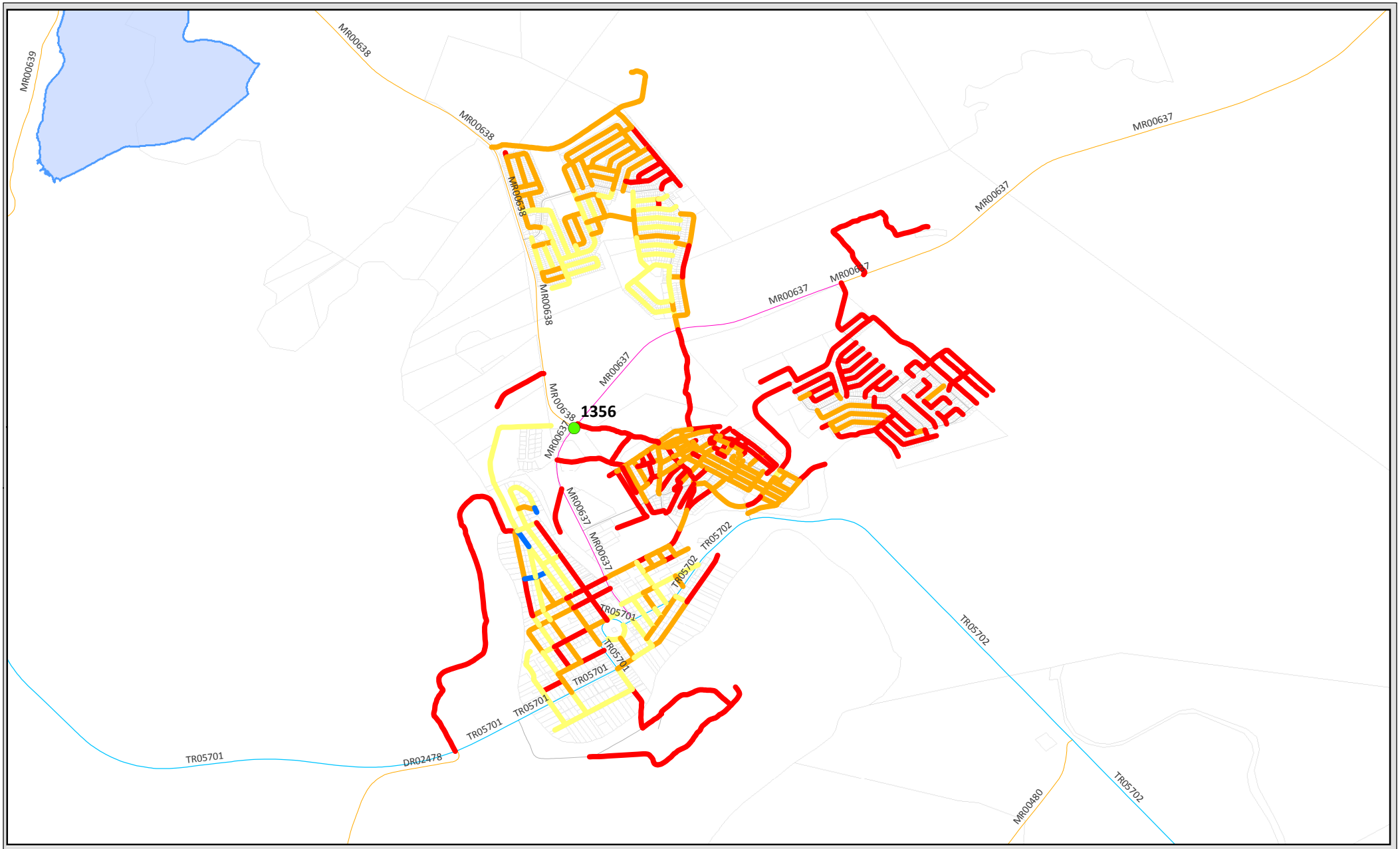
Project Title:	TIA - Proposed Foxwood Dam
Drawing No:	1204-P-004
Drawing Title:	Figure 4: Provincial & National Condition Assessment
Drawing Date:	June 2015

0 250 500 1 000 Meters

Scale 1:75 000

Prepared by : JC

Checked by : CH



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Counting Stations
Proposed R344 Diversion
Proposed MR00639 Diversion
Proposed Foxwood Dam

Visual Conditions
Very Good
Good
Fair
Poor
Very Poor

Project Title:	TIA - Proposed Foxwood Dam
Drawing No:	1204-P-005
Drawing Title:	Figure 5: Municipal Condition Assessment
Drawing Date:	June 2015

0 250 500 Meters

Scale 1:35 000

Prepared by : JC

Checked by : CH

4. RELOCATION OF MR00639

MR00639 is a provincial gravel road approximately 6.3km in length linking TR05701 (R63) in the south with MR00638 (R344) in the north. The road permits motorists who wish to travel between the R63 and R344 to bypass Adelaide, with a saving in distance travelled of approximately 8.4 km per direction.

The extent of the proposed dam and the portion MR00639 expected to be inundated by the dam are indicated on the Locality Plan **Figure 1**

4.1 TRAFFIC SURVEYS

The traffic volumes surveyed at the count stations on MR00639 and the results of the origin-destination survey are summarised on **Figures 2** and **3** respectively.

A total of 21 vehicles, 11 approaching (from MR00639) and 10 leaving the R344 junction were surveyed at station 1355.

A total of 40 vehicles, 18 approaching and 22 leaving the R63 junction were surveyed at station 1354.

Of the 11 vehicles recorded exiting MR00639 at the R344 junction, 10 of these vehicles were recorded entering MR00639 at the R63 junction.

Of the 10 vehicles recorded entering MR00639 at the R344 junction, 8 of these vehicles were recorded exiting MR00639 at the R63 junction.

Thus 18 of 21 vehicles entering and exiting MR00639 at the R344 travelled the entire length of MR00639 to and from the R63.

Of further interest is that of the remaining 12 vehicles recorded entering from the R63, 10 exited back onto the R63. It is noted that the average time that vehicles spent travelling along MR00639 is in the order of 6 minutes. Based on the distance that vehicles would have had to travel through Adelaide, it is assumed that a time saving in the order of 10 minutes can be achieved.

4.2 MR00639 TRAFFIC OBSERVATIONS

The following observations were made regarding traffic patterns on MR00639.

- Based on the 12-hour surveys, less than 50 vehicles per day use MR00639;
- The surveyed traffic volumes indicates that 40 vehicles entered and exited MR00639 from and to the R63;
- The surveyed traffic volumes indicates that 21 vehicles entered and exited MR00639 from and to the R344;
  - Of the 21 vehicles recorded at the R344 junction 18 vehicles (85%) travelled the entire length of MR00639 to and from the R63;
- The observations indicate the use of MR00639 as a short-cut as opposed to travelling through Adelaide, with a saving in traveling distance of 8.3km per direction;
- The survey results further indicate that 3 vehicles made the trip in both directions (1 of which travelled south to north twice), 6 in one direction from south to north and 5 in one direction from north to south – a total of only 14 different vehicles travelling (19 one-way trips);
- The closure of MR00639 will result in an additional 160km travel per day for affected vehicles (assuming each vehicle travels both ways – 16km per vehicle per day).

5. ANALYSIS OF TRAFFIC PATTERNS

5.1 EXISTING TRAFFIC PATTERNS

Figure 2 indicates current 12-hour traffic volumes on the approaches to the surveyed intersections. The 12-hour volumes have been factored up to represent approximate 24-hour (ADT) volumes based on the known proportions of night-time traffic at formal count stations in the area.

MR00639 carries approximately 20 vehicles per day close to the R344 and approximately 40 vehicles per day close to the R63.

The R344 carries between 100 and 120 vehicles per day between MR00637 in Adelaide and DR02491 north of the proposed dam.

DR02491 currently carries approximately 30 vehicles per day.

5.2 TRAFFIC PATTERNS AFTER DAM CONSTRUCTION

Figure 6 indicates reassigned traffic patterns after construction of the dam taking into consideration the realignment of both MR00638 and MR00639.

In this case, traffic flows along MR00639 remain the same, while traffic along DR02491 increases to accommodate the MR0638 traffic. Traffic volume on DR02491 increases from 35 vehicles to 85 vehicles between the existing junction with MR00638 and the crossing at the eastern end of the dam.

The increase is a result of existing traffic on MR00638 deviating around the dam.

It is considered necessary to upgrade DR02491 given the existing very poor condition of approximately two-thirds of this portion of the road.

Figure 7 indicates reassigned traffic patterns after construction of the dam taking into consideration the closure of MR00639 and the relocation of MR00638.

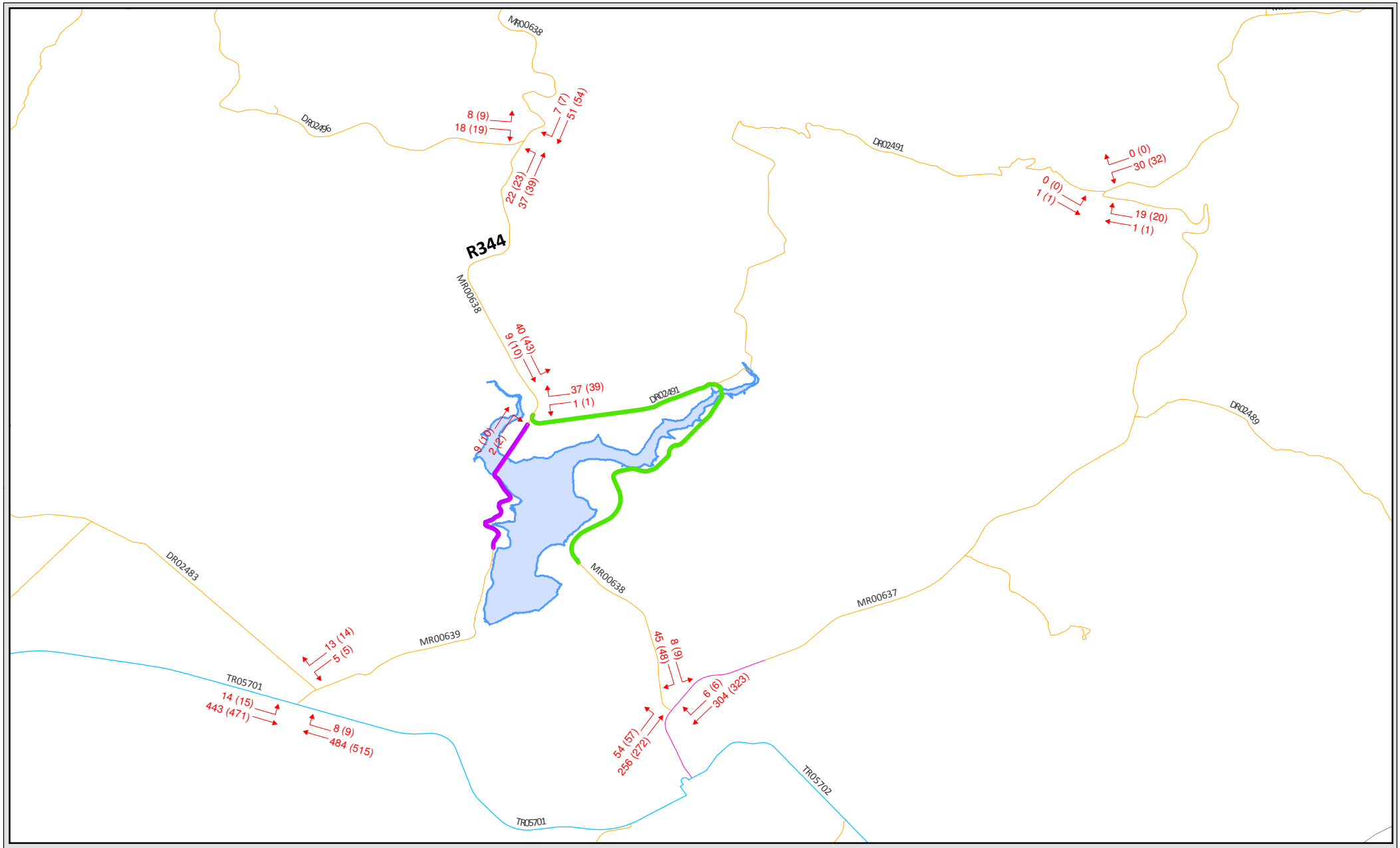
Traffic volumes on MR00639 reduce by approximately 23 vehicles per day from 43 to 20.

Traffic volumes on DR02491 increase from 35 vehicles to 94 vehicles between the existing junction with MR00638 and the crossing at the eastern end of the dam.

This increase is a result of deviated MR00638 traffic as well as reassigned MR00639 traffic.

The net impact of the closure of MR00639 is an increase in traffic currently on R344 and R63 of 10 vehicles per direction as a result of this traffic now having to detour through Adelaide.

By 2025, volumes on DR02491 would have increased to 104 vehicles per day of which 22 would be traffic diverted from MR00639.



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Counting Stations

Proposed R344 Diversion

Proposed MR00639 Diversion

Proposed Foxwood Dam

256 (272) - 12 hour (ADT)

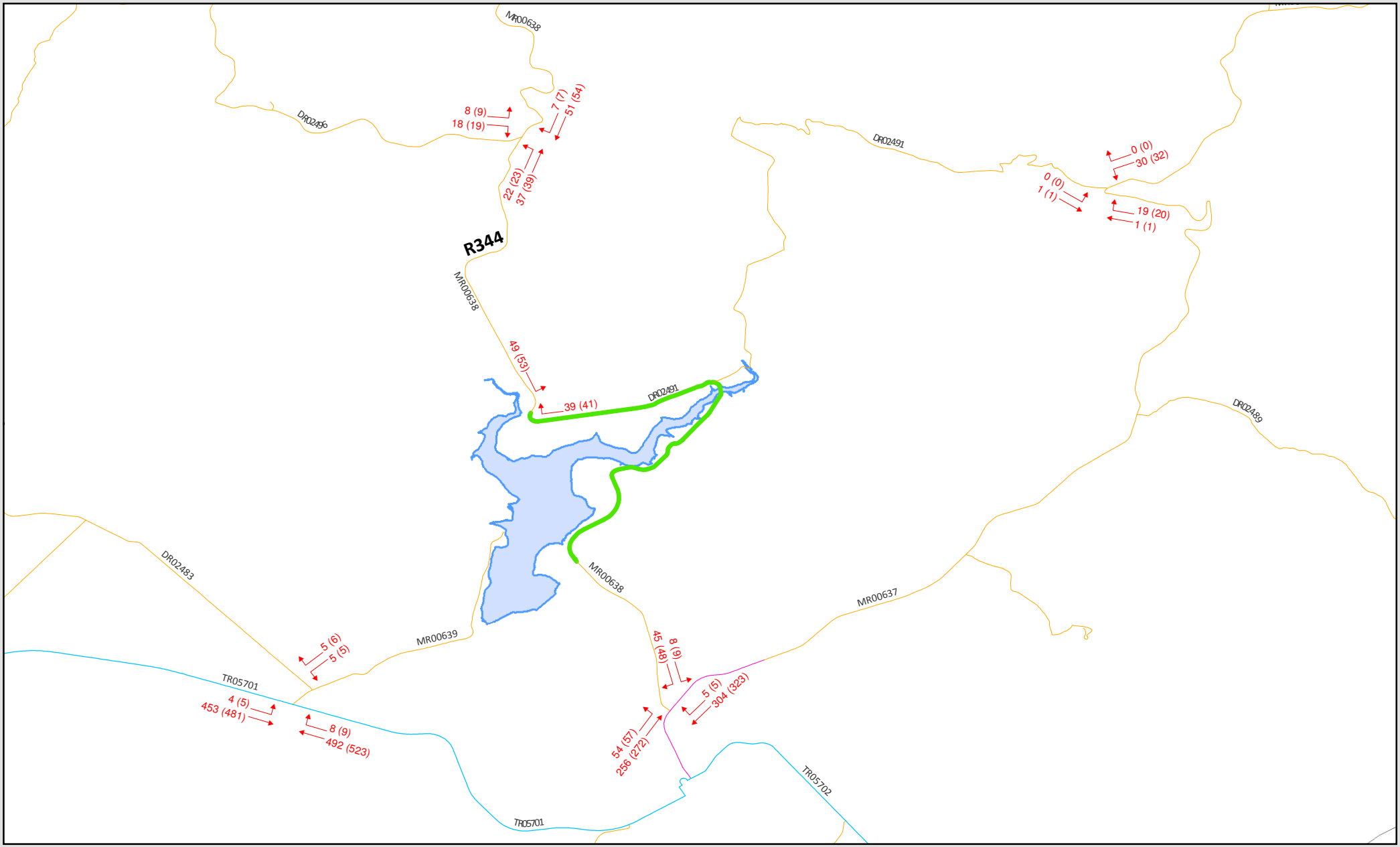
Project Title:	TIA - Proposed Foxwood Dam
Drawing No:	1204-P-006
Drawing Title:	Figure 6: Reassigned Traffic Volumes - MR00639 Realigned
Drawing Date:	June 2015

0 250500 1 000 1 500 Meters

Scale 1:100 000

Prepared by : JC

Checked by : CH



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Counting Stations

Proposed R344 Diversion

Proposed Foxwood Dam

256 (272) - 12 hour (ADT)

Project Title:	TIA - Proposed Foxwood Dam
Drawing No:	1204-P-007
Drawing Title:	Figure 7: Reassigned Traffic Volumes - MR00639 Closed
Drawing Date:	June 2015

0 250500 1 000 1 500 Meters

Scale 1:100 000

Prepared by : JC

Checked by : CH

6. CONSTRUCTION MATERIAL HAUL ROUTES

Quarries and borrow pits with construction material for the dam and roads have been identified by the client. These sites – one quarry and seven borrow pits as well as a possible commercial quarry - are indicated on **Figure 8**.

The quarry is situated north of the proposed dam approximately 4.5km north of the R344 / MR00639 junction.

Five of the seven borrow pits are situated within the surface are of the dam with one just south of the dam wall and the other just north of the dam straddling DR02491.

The commercial quarry is situated approximately 6km southwest of Adelaide adjacent to DR02478.

Proposed routes for hauling dam building material between these sites and the dam are also indicated on **Figure 8**.

The impact of construction traffic on these routes is discussed in further detail below

Quarry

The identified quarry is situated just east of MR00638 (R344) approximately 6.5km north of the dam wall. Material for the dam wall would be transported to the dam wall via approximately 4.5 km of MR00638 (R344) and 1.5km MR00639 to a point adjacent to the dam wall.

The condition of the route is poor to fair, with the portion of MR00638 (R344) requiring upgrading to minimise the impact of construction traffic on the route which will still be utilised by general traffic during the construction.

Upgrade of DR02491 and construction of the realignment of the R344 south of the dam to reduce the impact of construction traffic on general traffic may be a consideration.

Commercial Quarry

The licensed commercial quarry operated by African Mobile Crushers (Pty) Ltd, is situated just east of DR02478 approximately 10km south of the dam wall.

There are two possible routes along which material can be transported between the quarry and the dam wall, namely, via DR02478, R63 through Adelaide town and along the R344, or via DR02478, R63 and MR 00639.

The latter route option is the preferred option in that there is less potential for conflict for three reasons, namely lower traffic volumes along MR00639, the route does not intrude into the built-up area and there less impact on residents and road users, particularly pedestrians.

DR02478 is in a poor condition, while MR00639 is in a fair condition.

The R63 is in a good condition.

Borrow Pit C2

Borrow Pit C2 is situated north of the dam just south of the junction of MR00638 and DR2491 and east of MR00638.

The route from the Borrow pit to the dam wall is direct, via R344 and MR00639.

MR00638 (R344) is in a poor condition, while MR00639 is in a fair condition.

Borrow Pit C3

Borrow Pit C3 is situated north of the dam just east of the junction of MR00638 and DR02491 and straddles DR02491.

The route from the Borrow pit to the dam wall is direct, via R344 and MR00639.

DR02491 is in a very poor condition, MR00638 (R344) in a poor condition and MR00639 in a fair condition.

As DR02491 forms part of the future realigned R344 route, it will require upgrading both to prevent damage during construction and to ensure it is in good condition after construction

Borrow Pit C6

Borrow Pit C3 is situated north of the dam southeast of the junction of MR00638 and MR00639.

The route from the Borrow pit to the dam wall is direct, via R344 and MR00639.

This portion of MR00638 (R344) is in a poor condition and MR00639 in a fair condition.

As DR02491 forms part of the future realigned R344 route, it will require upgrading both to prevent damage during construction and to ensure it is in good condition after construction.

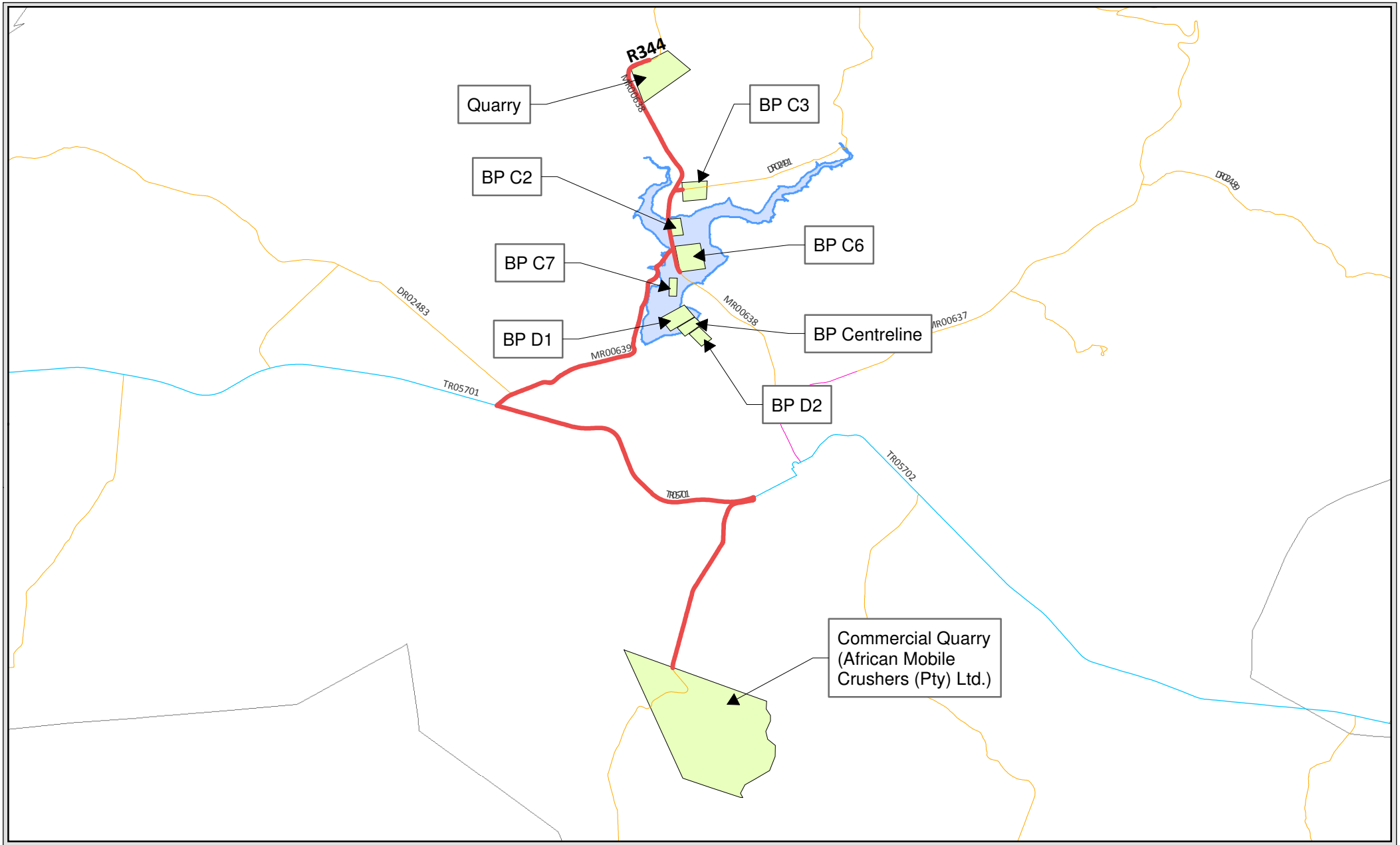
Borrow Pit C7, D1, D2 and Centreline

These borrow pits are situated within the dam surface area in close proximity to the dam wall. Materials transported from these borrow pits will not need to be transported via the main roads but rather make use of temporary construction roads.

General

During the construction period MR00639 and MR00638 (R344) will still be used by the general public. As such, they will need to be maintained to a standard that is acceptable to the roads authority and does not prejudice road users in terms of safety for the duration of the construction period.

Upon completion of construction, MR00638 between the quarry and Adelaide, including the realigned portion of R344 (along DR02491 and the new road) should be left in very good condition.



Engineering Advice and Services

Tel: (041) 581 2421

N

Legend

- Proposed Foxwood Dam
- Proposed Borrow Pits
- Possible Haul Roads

TIA - Proposed Foxwood Dam

1204-P-008

Drawing Title:

Figure 8: Possible Haul Routes

Drawing Date:

August 2015

0 0,5 1 2 Kilometers

Scale 1:130 000

Prepared by : JC

Checked by : CH

7. POTENTIAL IMPACTS

7.1 IMPACTS

The following potential traffic related impacts relating to the project have been identified. Note that some impacts will occur over the course of construction of the dam while others will be permanent.

Construction Impacts

- Increased Construction Traffic on Existing Roads
  Construction vehicles will travel along all roads between sources of material (quarries and borrow pits) and the dam wall and will interact with existing general traffic on these roads

- Increased Traffic Volumes on Existing Roads
  As a result of the construction increased traffic volumes will occur along the sections of road used to haul material.

- Road Condition
  The condition of the roads used to haul material will be negatively impacted upon by heavy construction haul vehicles during construction.

- Traffic Safety
  The safety of general traffic along the roads surrounding the dam may be compromised as a result of construction haul vehicles on these roads.

  The following safety issues may arise:
  - Possible collisions due to heavy vehicles travelling through areas with relatively high pedestrian activity;
  - Possible collisions on construction haul roads due to poor visibility caused by dust;
  - High speed through traffic on R63 interacting with slow moving heavy construction haul vehicles at junctions with DR02478 and MR00639.

Operational Impacts

- Closure of Existing Roads or Road Sections
  Construction of the dam will result in the closure of MR00639 and the realignment of a portion of MR00638 (R344) around the eastern edge of the dam and along DR02491.

- Increased Traffic Volumes on Existing Roads
  An additional 19 vehicle trips per day will make use of MR00638 (R344) as a result of the closure of MR00639 increasing to 22 by 2025.

  An additional 70 vehicle trips per day will make use of the realigned R344 along DR02491 increasing to 77 by 2025.

- Road Condition
  Given low operational traffic volumes it is not anticipated that significant damage will be caused to the road network, provided that loads are within legislated limits and necessary maintenance occurs in terms of Department of Roads and Public Works guidelines;

- Road Capacity
  A minimal reduction in intersection and link capacity (directly related to the low additional trips identified).

- Traffic Safety
  The following safety issues may arise as a result of additional vehicle movements along the R344 route:
  - Possible collisions due to additional vehicles travelling through areas with relatively high pedestrian activity.

7.2 IMPACT ASSESSMENT

As indicated in **Chapter 6**, assumptions and recommendations have been made on the distribution of construction traffic along various routes between the Dam wall and the identified quarries and borrow pits. These assumptions are based on observations of existing traffic patterns and also consider the most suitable routes between the dam wall and the quarry sites, in terms of minimising interaction with other road users.

Traffic volumes have been assessed to indicate the impact of the proposed construction of the dam on a daily basis.

A general assessment has been undertaken of impacts on various factors, as provided in the tables below. Note that this assessment does not deal with issues relating to noise, emissions, job creation or environmental matters, as the author is not qualified to comment on these issues.

The impact rating system used for the study is indicated in **Table 2** below. A more detailed description is attached as **Annexure D**.

Table 2: Impact Assessment Rating System

Nature of the Impact	This should include a description of the proposed impact to indicate if the impact is a direct, indirect or a cumulative impact.
Extent	LOW: Site specific, MEDIUM: Local, HIGH: Regional or national
Duration	LOW: 0-5 years or Temporary, short term MEDIUM: 5-15 years, medium term HIGH: >15 Years, long term or permanent
Intensity	LOW: < 20%, No measurable change MEDIUM: 20-60%, Measurable change in system HIGH: >80%, Substantial change in system
Probability	LOW: Unlikely or seldom MEDIUM: Possible or frequent HIGH: Highly likely or definite
Degree of Confidence	Low, medium or High
Status and Significance (without mitigation)	Calculate from Matrix Tables below using Extent, Duration and Intensity prior to mitigation. Provide an indication whether Positive (+), Negative (-) or Neutral (o)
Mitigation	Overview of mitigatory measures to mitigate potentially negative impacts or enhance potential positive impacts indicating how this mitigatory measure impacts on the significance of the impact
Status and Significance (after mitigation)	Recalculate from Matrix Tables below Extent, Duration and Intensity post to mitigation. Provide an indication whether the status of the impact is Positive (+), Negative (-) or Neutral (o)

7.2.1 Construction Impacts

Table 3: Impact Assessment: Increased Construction Traffic on Existing Roads

Impact Assessment: Increased construction traffic volumes		
Description	**Impact**	**Comment / Reason**
Extent	Medium	Up to 9 km radius from dam wall
Duration	Low	Short-term but daily for construction duration
Intensity	High (-)	Continuous additional traffic along haul routes
Probability	High	Additional trips will occur along haul routes
Degree of Confidence	High	
Status and Significance of impact (without mitigation)	High (-)	Additional construction traffic volumes
Mitigation		Create awareness of presence of construction traffic, restrict haul operations to low-volume periods
Status and Significance of impact (with mitigation)	Medium (+)	Minimise interaction between normal and construction traffic

Table 4: Impact Assessment: Increased Traffic Volumes on Existing Roads

Impact Assessment: Increased traffic volumes on existing roads		
Description	**Impact**	**Comment / Reason**
Extent	Medium	6 km radius from dam wall
Duration	Low	Short-term but daily for construction duration
Intensity	Low (-)	19 additional trips per day on R344 with MR00639 closed
Probability	High	Existing route closed – only one alternative
Degree of Confidence	High	
Status and Significance of impact (without mitigation)	Medium (o)	Minimal increase in traffic volumes
Mitigation	**None required**	
Status and Significance of impact (with mitigation)	Medium (o)	Minimal increase in traffic volumes

Table 5: Impact Assessment: Road Condition

Impact Assessment: Road condition		
Description	**Impact**	**Comment / Reason**
Extent	Medium	10 km radius from site
Duration	Low	Short-term but daily for construction duration
Intensity	High (-)	Continuous additional traffic along haul routes
Probability	High	Additional trips will occur along haul routes
Degree of Confidence	High	
Status and Significance of impact (without mitigation)	High (-)	Damage caused to roads due to high construction vehicle volumes
Mitigation		Regular rolling, blading and regravelling
Status and Significance of impact (with mitigation)	High (+)	Ensure road condition remains at acceptable standard

Table 6: Impact Assessment: Traffic Safety – Impaired Visibility due to Dust

Impact Assessment: Traffic Safety – Impaired visibility due to dust		
Description	**Impact**	**Comment / Reason**
Extent	Medium	Up to 10 km radius from dam wall
Duration	Low	Short-term but daily for construction duration
Intensity	High (-)	Continuous additional traffic along haul routes
Probability	High	Additional construction vehicle trips will occur along haul routes
Degree of Confidence	High	
Status and Significance of impact (without mitigation)	High (-)	Possible vehicle collisions as a result of impaired visibility
Mitigation		Regular rolling, blading and regravelling to minimise fine material
Status and Significance of impact (with mitigation)	Medium (+)	Reduced dust interfering with visibility

Table 7: Impact Assessment: Traffic Safety – Conflict with High Speed Traffic

Impact Assessment: Traffic Safety – Conflict with high speed traffic at R63 junctions		
Description	**Impact**	**Comment / Reason**
Extent	Medium	7 km radius from dam wall
Duration	Low	Short-term but daily for construction duration
Intensity	Medium (-)	Traffic from commercial quarry likely to operate with headways
Probability	High	Traffic from Commercial quarry must pass through R63 junctions
Degree of Confidence	High	
Status and Significance of impact (without mitigation)	Medium (-)	Possible vehicle collisions at R63 junctions
Mitigation		Create awareness of presence of construction traffic by means of high-visibility signage, restrict haul operations to low-volume periods
Status and Significance of impact (with mitigation)	Medium (+)	Reduced interaction between fast-moving and construction traffic

7.2.2 Operational Impacts

Table 8: Impact Assessment: Closure of Existing Roads or Road Sections

Impact Assessment: Closure of existing roads or road sections		
Description	**Impact**	**Comment / Reason**
Extent	Medium	10 km radius from site
Duration	High	Permanent
Intensity	Low (-)	Impacts on approximately 19 trips per day (2015) increasing to 22 by 2025
Probability	High	Closure of MR00639 and diversion of MR00638
Degree of Confidence	High	
Status and Significance of impact (without mitigation)	Low (-)	MR00639 closure will result in detour of approximately 16 km for affected vehicles; Diversion of R344 will result in an additional 6km detour.
Mitigation	**None required**	
Status and Significance of impact (with mitigation)	Low (-)	Negative but low impact

Table 9: Impact Assessment: Increased Traffic Volumes on Existing Roads

Impact Assessment: Increased traffic volumes on existing roads		
Description	**Impact**	**Comment / Reason**
Extent	Medium	7 km radius from dam
Duration	High	Permanent
Intensity	Low (-)	19 additional vehicle trips along R344, R63 and through Adelaide due to MR00639 closure (2015)
Probability	High	Additional trips will travel along this route
Degree of Confidence	High	
Status and Significance of impact (without mitigation)	Low (o)	Minimal additional traffic volumes
Mitigation	**None required**	
Status and Significance of impact (with mitigation)	Low (o)	Minimal additional traffic volumes

Table 10: Impact Assessment: Road Condition

Impact Assessment: Road condition		
Description	**Impact**	**Comment / Reason**
Extent	Medium	7 km radius from dam
Duration	High	Permanent
Intensity	Low (-)	19 additional vehicle trips along R344 and through Adelaide due to MR00639 closure
Probability	High	Additional trips will travel along this route
Degree of Confidence	High	
Status and Significance of impact (without mitigation)	Low (o)	Minimal additional traffic volumes
Mitigation	**None required**	
Status and Significance of impact (with mitigation)	Low (o)	Provided that regular maintenance is effected

Table 11: Impact Assessment: Road Capacity

Impact Assessment: Road capacity		
Description	**Impact**	**Comment / Reason**
Extent	Medium	7 km radius from dam
Duration	High	Permanent
Intensity	Low (-)	19 additional vehicle trips along R344, R63 and through Adelaide due to MR00639 (2015)
Probability	High	Minimal additional traffic volumes
Degree of Confidence	High	
Status and Significance of impact (without mitigation)	Low (o)	Minimal impact on link or intersection operation in terms of available capacity
Mitigation	**None required**	
Status and Significance of impact (with mitigation)	Low (o)	Minimal impact on link or intersection operation in terms of available capacity

Table 12: Impact Assessment: Traffic Safety: Increased Traffic on R344- Pedestrian Impact

Impact Assessment: Traffic Safety – Increased traffic – Pedestrian impact		
Description	**Impact**	**Comment / Reason**
Extent	Medium	7 km radius from dam
Duration	High	Permanent
Intensity	Low (-)	19 additional vehicle trips along R344 due to MR00639 closure (2015)
Probability	Medium	Possible collisions may occur due to high pedestrian activity along R344 and R63 through Adelaide
Degree of Confidence	High	
Status and Significance of impact (without mitigation)	Low (-)	Possible collisions – collisions can lead to fatalities
Mitigation		Ensure pedestrian accommodation measures in place and continued enforcement applied
Status and Significance of impact (with mitigation)	Low (+)	Visible enforcement and protection of pedestrians can prevent collisions

Table 13: Impact Assessment: Summary

ASSESSMENT		PRIOR TO MITIGATION							POST MITIGATION							
Impact Description	Phase	Extent	Duration	Intensity	Probability	Confidence	Status (+ o -)	Significance of Impact	Mitigation Measures	Extent	Duration	Intensity	Probability	Confidence	Status (+ o -)	Significance of Impact
Increased Construction Traffic on Existing Roads	Construction	Medium	Low	High	High	High	Negative	High	High-visibility signage, restrict haul operations	Medium	Low	High	High	High	Positive	Medium
Increased Traffic Volumes on Existing Roads	Construction	Medium	Low	Low	High	High	Neutral	Mediu m	None Required	Medium	Low	Low	High	High	Neutral	Medium
Road Condition	Construction	Medium	Low	High	High	High	Negative	High	Continuous maintenance	Medium	Low	Medi um	Medium	High	Positive	High
Traffic Safety – Impaired Visibility due to Dust	Construction	Medium	Low	High	High	High	Negative	High	Continuous maintenance	Medium	Low	Medi um	High	High	Positive	Medium
Traffic Safety – Conflict with High Speed Traffic	Construction	Medium	Low	Medium	High	High	Negative	Mediu m	High-visibility signage, restrict haul operations	Medium	Low	Medi um	Medium	High	Positive	Medium
Closure of Existing Roads or Road Sections	Operational	Medium	High	Low	High	High	Negative	Low	None Required	Medium	High	Low	High	High	Negative	Low
Increased Traffic Volumes on Existing Roads	Operational	Medium	High	Low	High	High	Neutral	Low	None Required	Medium	High	Low	High	High	Neutral	Low
Road Condition	Operational	Medium	High	Low	High	High	Neutral	Low	None Required	Medium	High	Low	High	High	Neutral	Low
Road Capacity	Operational	Medium	High	Low	High	High	Neutral	Low	None Required	Medium	High	Low	High	High	Neutral	Low
Traffic Safety: Increased Traffic on R344- Pedestrian Impact	Operational	Medium	High	Low	Medium	High	Negative	Low	Visible enforcement and pedestrian accommodation	Medium	High	Low	Medium	High	Positive	Low

8. CONCLUSIONS

- Traffic volumes surveys indicate a total of 115 vehicle trips travel along the R344 per day (total both directions);
- Origin - destination surveys conducted on the MR00639 indicate that 14 vehicles travel a total of 19 trips per day along the full length of this road;
- The closure of MR00639 affects 19 trips per day that travel the full length of this road and would result in these trips diverting to the R344 and R63 through Adelaide;
- Data sourced from fixed count stations in the vicinity of Adelaide indicate that between 2007 and 2013, traffic volumes escalated by approximately 1% per annum;
- The additional distance travelled by the diverted vehicles amounts to approximately 160km per day;
- Given that these trips represent only 15% of the surveyed two-way traffic volume on the R344 just north of MR00639 - 115 vehicles, it can be concluded that the additional cost to these vehicles over a 20 year period would be less than the cost to realign MR00639 around the dam;
- The affected main roads – MR00639, MR00638, MR00637, DR02478 and DR02491 are in a fair to very poor condition and would require upgrading to Eastern Cape Roads and Public Works standards;
- During the construction period, significant volumes of construction vehicles would be required to haul material between the quarry, borrowpits C2, C3 and C6 for the dam wall construction;
- The affected roads would require continuous maintenance during construction to ensure safe operating conditions, particularly with regard to dust generated and affecting visibility. Such maintenance would need to include blading, rolling and regravelling to minimise build-up of fine material
- DR02491, which will form part of the realigned R344 route once the dam is completed, is in a very poor condition between MR00638 (R344) and the point where it crosses the dam and will need to be upgraded to a geometric standard suitable for a district road;
- Upon completion of construction the affected roads must be left in a very good condition to the satisfaction of the Eastern Cape Department of Roads and Public Works;
- Suitable and adequate temporary construction signage in accordance with the requirements of the **SADC Road Traffic Signs Manual** [(6)] must be displayed on the approaches to and along all affected roads in order to alert motorists to the presence of construction vehicles;
- Construction haulage operations must be scheduled to occur during low traffic periods to minimise conflict with general traffic;
- Should the commercial quarry along DR02478 be used to source construction material, vehicle movements must be scheduled to occur during low traffic periods to avoid conflict with fastmoving vehicles on the R63 at junctions with DR02478 and MR00639;
- Upon completion of haulage operations between the dam and the commercial quarry DR02478 must be left in a good condition to the satisfaction of the Eastern Cape Department of Roads and Public Works;
- Steps must be taken to ensure pedestrian traffic along the R344 and R63 through Adelaide are accommodated to prevent possible accidents.

9. REFERENCES

1. Joubert, Sampson, et al, **TMH 16 Volume 1- South African Traffic Impact and Site Assessment Manual**, COTO, August 2012.

2. *Aurecon*, **Amathole District Integrated Transport Plan – CPTR and Needs Assessment**, Amathole District Municipality, 2012.

3. *Setplan*, **Nxuba Spatial Development Framework Review**, Nxuba Municipality, 2011.

4. *T Hacking, AATS Envirolink,* **An Innovative Approach to Structuring Environmental Impact Assessment Reports***,* 1998.

5. *Arup (Pty) Ltd*, **Feasibility Study for Foxwood Dam – Inception Report**, Department of Water Affairs, 2013

6. *De Leuw Cather & SENA*, **SADC Road Traffic Signs Manual**, Department of Transport, June 1999.

ANNEXURE A

Classified Traffic Counts

RRAMS INTERSECTION TRAFFIC COUNT OUTPUT

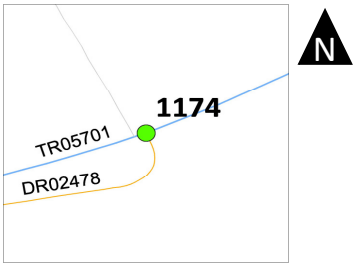
Station ID 1174

Intersection DR02478 / TR05701

Local Municipality Nxuba

District Municipality Amathole

Date: 2015-04-29



Enumerator: Nicholas Masiphula **Co-ord :** X 26.28600 Y -32.71532

Volumes per movement

Direction	NB				WB				SB				EB				TOTAL
Link ID	1059822				1060142				1060214				1060144				
Road Name	DR02478				TR05701								TR05701				
Movement	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	
M'ment ID	1	2	3		4	5	6		7	8	9		10	11	12		
12-hr																	
12-hr car	5	0	41	**46**	46	836	1	**883**	0	0	0	**0**	0	872	6	**878**	1807
12-hr taxi	0	0	0	**0**	0	46	0	**46**	0	0	0	**0**	0	46	0	**46**	92
12-hr bus	0	0	0	**0**	0	12	0	**12**	0	0	0	**0**	0	15	0	**15**	27
12-hr HV	1	1	4	**6**	5	95	0	**100**	0	0	2	**2**	1	102	0	**103**	211
12-hr all veh	**6**	**1**	**45**	**52**	**51**	**989**	**1**	**1041**	**0**	**0**	**2**	**2**	**1**	**1035**	**6**	**1042**	**2137**
AM peak hr																	
AM peak car	0	0	4	**4**	7	106	0	**113**	0	0	0	**0**	0	69	1	**70**	187
AM peak taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	6	0	**6**	6
AM peak bus	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	0	4	0	**4**	5
AM peak HV	0	0	0	**0**	0	6	0	**6**	0	0	0	**0**	1	15	0	**16**	22
AM peak all veh	**0**	**0**	**4**	**4**	**7**	**113**	**0**	**120**	**0**	**0**	**0**	**0**	**1**	**94**	**1**	**96**	**220**
OFF peak hr																	
OFF peak car	1	0	3	**4**	3	55	0	**58**	0	0	0	**0**	0	105	0	**105**	167
OFF peak HV	0	0	0	**0**	0	8	0	**8**	0	0	0	**0**	0	6	0	**6**	14
OFF peak bus	0	0	0	**0**	0	3	0	**3**	0	0	0	**0**	0	2	0	**2**	5
OFF peak taxi	0	0	1	**1**	0	12	0	**12**	0	0	0	**0**	0	8	0	**8**	21
OFF peak all veh	**1**	**0**	**4**	**5**	**3**	**78**	**0**	**81**	**0**	**0**	**0**	**0**	**0**	**121**	**0**	**121**	**207**
PM peak hr																	
PM peak car	2	0	2	**4**	5	76	0	**81**	0	0	0	**0**	0	91	3	**94**	179
PM peak HV	0	0	0	**0**	0	13	0	**13**	0	0	0	**0**	0	4	0	**4**	17
PM peak bus	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	0	2	0	**2**	3
PM peak taxi	0	0	0	**0**	0	8	0	**8**	0	0	0	**0**	0	4	0	**4**	12
PM peak all veh	**2**	**0**	**2**	**4**	**5**	**98**	**0**	**103**	**0**	**0**	**0**	**0**	**0**	**101**	**3**	**104**	**211**
ADT (24-hr)																	
24-hr car	5	0	44	**49**	52	947	1	**1000**	0	0	0	**0**	0	988	7	**994**	2043
24-hr taxi	0	0	0	**0**	0	52	0	**52**	0	0	0	**0**	0	52	0	**52**	104
24-hr bus	0	0	0	**0**	0	14	0	**14**	0	0	0	**0**	0	17	0	**17**	31
24-hr HV	1	1	4	**49**	6	108	0	**1066**	0	0	2	**0**	1	116	0	**1063**	2178
24-hr all veh	**7**	**1**	**48**	**56**	**58**	**1120**	**1**	**1179**	**0**	**0**	**2**	**2**	**1**	**1172**	**7**	**1180**	**2417**

Volumes per approach link (2-way)

	NB	WB	SB	EB
Link ID	1059822	1060142	1060214	1060144
ADT	120	2399	5	2309
% HV	10%	11%	79%	11%

RRAMS INTERSECTION TRAFFIC COUNT OUTPUT

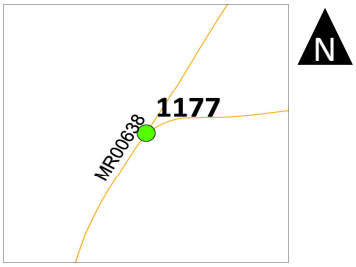
Station ID 1177

Intersection MR00638 / DR02491

Local Municipality Nxuba

District Municipality Amathole

Date: 2015-03-25



Enumerator: Nicholas Masiphula **Co-ord :** X 26.26746 Y -32.64398

Volumes per movement

Direction	NB				WB				SB				EB				TOTAL
Link ID	1059910				1060204				1060206				No Road				
Road Name	MR00638				DR02491				MR00638								
Movement	Left	Through	Right	**Total**	Left	Through	Right	**Total**	Left	Through	Right	**Total**	Left	Through	Right	**Total**	
M'ment ID	1	2	3		4	5	6		7	8	9		10	11	12		
12-hr																	
12-hr car	0	37	15	**52**	13	0	2	**15**	2	38	0	**40**	0	0	0	**0**	107
12-hr taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
12-hr bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
12-hr HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
12-hr all veh	**0**	**37**	**15**	**52**	**13**	**0**	**2**	**15**	**2**	**38**	**0**	**40**	**0**	**0**	**0**	**0**	**107**
AM peak hr																	
AM peak car	0	3	4	**7**	4	0	0	**4**	0	4	0	**4**	0	0	0	**0**	15
AM peak taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
AM peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
AM peak HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
AM peak all veh	**0**	**3**	**4**	**7**	**4**	**0**	**0**	**4**	**0**	**4**	**0**	**4**	**0**	**0**	**0**	**0**	**15**
OFF peak hr																	
OFF peak car	0	4	3	**7**	1	0	0	**1**	0	5	0	**5**	0	0	0	**0**	13
OFF peak HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
OFF peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
OFF peak taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
OFF peak all veh	**0**	**4**	**3**	**7**	**1**	**0**	**0**	**1**	**0**	**5**	**0**	**5**	**0**	**0**	**0**	**0**	**13**
PM peak hr																	
PM peak car	0	3	3	**6**	1	0	0	**1**	0	6	0	**6**	0	0	0	**0**	13
PM peak HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak all veh	**0**	**3**	**3**	**6**	**1**	**0**	**0**	**1**	**0**	**6**	**0**	**6**	**0**	**0**	**0**	**0**	**13**
ADT (24-hr)																	
24-hr car	0	39	16	**55**	14	0	2	**16**	2	40	0	**43**	0	0	0	**0**	114
24-hr taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
24-hr bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
24-hr HV	0	0	0	**55**	0	0	0	**16**	0	0	0	**43**	0	0	0	**0**	114
24-hr all veh	**0**	**39**	**16**	**55**	**14**	**0**	**2**	**16**	**2**	**40**	**0**	**43**	**0**	**0**	**0**	**0**	**114**

Volumes per approach link (2-way)

	NB	WB	SB	EB
Link ID	1059910	1060204	1060206	No Road
ADT	110	34	84	0
% HV	0%	0%	0%	-

RRAMS INTERSECTION TRAFFIC COUNT OUTPUT

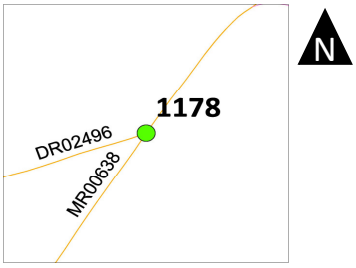
Station ID 1178

Intersection MR00638 / DR02496

Local Municipality Nxuba

District Municipality Amathole

Date: 2015-04-28



Enumerator: Nicholas Masiphula **Co-ord :** X 26.26698 Y -32.59298

Volumes per movement

Direction	NB				WB				SB				EB				TOTAL
Link ID	1060015				No Road				1059918				1059920				
Road Name	MR00638								MR00638				DR02496				
Movement	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	
M'ment ID	1	2	3		4	5	6		7	8	9		10	11	12		
12-hr																	
12-hr car	22	33	0	**55**	0	0	0	**0**	0	44	7	**51**	8	0	18	**26**	132
12-hr taxi	0	3	0	**3**	0	0	0	**0**	0	3	0	**3**	0	0	0	**0**	6
12-hr bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
12-hr HV	0	1	0	**1**	0	0	0	**0**	0	4	0	**4**	0	0	0	**0**	5
12-hr all veh	**22**	**37**	**0**	**59**	**0**	**0**	**0**	**0**	**0**	**51**	**7**	**58**	**8**	**0**	**18**	**26**	**143**
AM peak hr																	
AM peak car	2	3	0	**5**	0	0	0	**0**	0	5	3	**8**	1	0	2	**3**	16
AM peak taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
AM peak bus	0	0	0	**0**	0	0	0	**0**	0	0	3	**3**	0	0	0	**0**	3
AM peak HV	0	0	0	**0**	0	0	0	**0**	0	0	3	**3**	0	0	0	**0**	3
AM peak all veh	**2**	**3**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**5**	**9**	**14**	**1**	**0**	**2**	**3**	**22**
OFF peak hr																	
OFF peak car	4	5	0	**9**	0	0	0	**0**	0	6	2	**8**	0	0	0	**0**	17
OFF peak HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
OFF peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
OFF peak taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
OFF peak all veh	**4**	**5**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**6**	**2**	**8**	**0**	**0**	**0**	**0**	**17**
PM peak hr																	
PM peak car	3	3	0	**6**	0	0	0	**0**	0	6	0	**6**	3	0	1	**4**	16
PM peak HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak all veh	**3**	**3**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**6**	**3**	**0**	**1**	**4**	**16**
ADT (24-hr)																	
24-hr car	23	35	0	**59**	0	0	0	**0**	0	47	7	**54**	9	0	19	**28**	140
24-hr taxi	0	3	0	**3**	0	0	0	**0**	0	3	0	**3**	0	0	0	**0**	6
24-hr bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
24-hr HV	0	1	0	**62**	0	0	0	**0**	0	4	0	**57**	0	0	0	**28**	147
24-hr all veh	**23**	**39**	**0**	**63**	**0**	**0**	**0**	**0**	**0**	**54**	**7**	**62**	**9**	**0**	**19**	**28**	**152**

Volumes per approach link (2-way)

	NB	WB	SB	EB
Link ID	1060015	No Road	1059918	1059920
ADT	136	0	110	59
% HV	4%	-	5%	0%

RRAMS INTERSECTION TRAFFIC COUNT OUTPUT

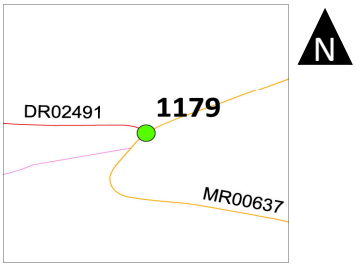
Station ID 1179

Intersection MR00637 / DR02491

Local Municipality Nxuba

District Municipality Amathole

Date: 2015-04-08



Enumerator: Nicholas Masiphula **Co-ord :** X 26.37099 Y -32.60216

Volumes per movement

Direction	NB				WB				SB				EB				TOTAL
Link ID	1060011				No Road				1059924				1059916				
Road Name	MR00637								MR00637				DR02491				
Movement	Left	Through	Right	**Total**	Left	Through	Right	**Total**	Left	Through	Right	**Total**	Left	Through	Right	**Total**	
M'ment ID	1	2	3		4	5	6		7	8	9		10	11	12		
12-hr																	
12-hr car	1	16	0	**17**	0	0	0	**0**	0	27	0	**27**	0	0	1	**1**	45
12-hr taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
12-hr bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
12-hr HV	0	3	0	**3**	0	0	0	**0**	0	3	0	**3**	0	0	0	**0**	6
12-hr all veh	**1**	**19**	**0**	**20**	**0**	**0**	**0**	**0**	**0**	**30**	**0**	**30**	**0**	**0**	**1**	**1**	**51**
AM peak hr																	
AM peak car	0	3	0	**3**	0	0	0	**0**	0	1	0	**1**	0	0	1	**1**	5
AM peak taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
AM peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
AM peak HV	0	0	0	**0**	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	1
AM peak all veh	**0**	**3**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0**	**1**	**1**	**6**
OFF peak hr																	
OFF peak car	1	3	0	**4**	0	0	0	**0**	0	5	0	**5**	0	0	0	**0**	9
OFF peak HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
OFF peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
OFF peak taxi	0	1	0	**1**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	1
OFF peak all veh	**1**	**4**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**5**	**0**	**0**	**0**	**0**	**10**
PM peak hr																	
PM peak car	0	1	0	**1**	0	0	0	**0**	0	2	0	**2**	0	0	0	**0**	3
PM peak HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak all veh	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0**	**0**	**0**	**3**
ADT (24-hr)																	
24-hr car	1	17	0	**18**	0	0	0	**0**	0	29	0	**29**	0	0	1	**1**	48
24-hr taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
24-hr bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
24-hr HV	0	3	0	**18**	0	0	0	**0**	0	3	0	**29**	0	0	0	**1**	48
24-hr all veh	**1**	**20**	**0**	**21**	**0**	**0**	**0**	**0**	**0**	**32**	**0**	**32**	**0**	**0**	**1**	**1**	**54**

Volumes per approach link (2-way)

	NB	WB	SB	EB
Link ID	1060011	No Road	1059924	1059916
ADT	54	0	52	2
% HV	12%	-	12%	0%

RRAMS INTERSECTION TRAFFIC COUNT OUTPUT

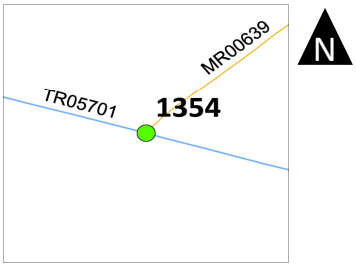
Station ID 1354

Intersection MR00639 / TR05701

Local Municipality Amahlati

District Municipality Amathole

Date: 2015-05-11



Enumerator: Nicholas Masiphula **Co-ord :** X 27.27867 Y -32.61530

Volumes per movement

Direction	NB				WB				SB				EB				TOTAL
Link ID	1059848				1060173				No Road				1059844				
Road Name	MR00639				TR05701								TR05701				
Movement	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	Left	Through	Right	Total	
M'ment ID	1	2	3		4	5	6		7	8	9		10	11	12		
12-hr																	
12-hr car	5	0	12	**17**	13	378	0	**391**	0	0	0	**0**	0	413	8	**421**	829
12-hr taxi	0	0	0	**0**	0	22	0	**22**	0	0	0	**0**	0	22	0	**22**	44
12-hr bus	0	0	0	**0**	0	2	0	**2**	0	0	0	**0**	0	2	0	**2**	4
12-hr HV	0	0	1	**1**	1	41	0	**42**	0	0	0	**0**	0	47	0	**47**	90
12-hr all veh	**5**	**0**	**13**	**18**	**14**	**443**	**0**	**457**	**0**	**0**	**0**	**0**	**0**	**484**	**8**	**492**	**967**
AM peak hr																	
AM peak car	0	0	5	**5**	4	30	0	**34**	0	0	0	**0**	0	47	0	**47**	86
AM peak taxi	0	0	0	**0**	0	6	0	**6**	0	0	0	**0**	0	1	0	**1**	7
AM peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
AM peak HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	3	0	**3**	3
AM peak all veh	**0**	**0**	**5**	**5**	**4**	**36**	**0**	**40**	**0**	**0**	**0**	**0**	**0**	**51**	**0**	**51**	**96**
OFF peak hr																	
OFF peak car	0	0	0	**0**	2	38	0	**40**	0	0	0	**0**	0	37	0	**37**	77
OFF peak HV	0	0	0	**0**	0	2	0	**2**	0	0	0	**0**	0	0	0	**0**	2
OFF peak bus	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	0	1	0	**1**	2
OFF peak taxi	0	0	0	**0**	0	5	0	**5**	0	0	0	**0**	0	6	0	**6**	11
OFF peak all veh	**0**	**0**	**0**	**0**	**2**	**46**	**0**	**48**	**0**	**0**	**0**	**0**	**0**	**44**	**0**	**44**	**92**
PM peak hr																	
PM peak car	0	0	0	**0**	1	39	0	**40**	0	0	0	**0**	0	45	2	**47**	87
PM peak HV	0	0	0	**0**	0	3	0	**3**	0	0	0	**0**	0	3	0	**3**	6
PM peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak taxi	0	0	0	**0**	0	4	0	**4**	0	0	0	**0**	0	10	0	**10**	14
PM peak all veh	**0**	**0**	**0**	**0**	**1**	**46**	**0**	**47**	**0**	**0**	**0**	**0**	**0**	**58**	**2**	**60**	**107**
ADT (24-hr)																	
24-hr car	5	0	13	**18**	14	402	0	**416**	0	0	0	**0**	0	439	9	**448**	882
24-hr taxi	0	0	0	**0**	0	23	0	**23**	0	0	0	**0**	0	23	0	**23**	47
24-hr bus	0	0	0	**0**	0	2	0	**2**	0	0	0	**0**	0	2	0	**2**	4
24-hr HV	0	0	1	**18**	1	44	0	**441**	0	0	0	**0**	0	50	0	**473**	933
24-hr all veh	**5**	**0**	**14**	**19**	**15**	**471**	**0**	**486**	**0**	**0**	**0**	**0**	**0**	**515**	**9**	**523**	**1029**

Volumes per approach link (2-way)

	NB	WB	SB	EB
Link ID	1059848	1060173	No Road	1059844
ADT	43	1015	0	1000
% HV	5%	10%	-	10%

RRAMS INTERSECTION TRAFFIC COUNT OUTPUT

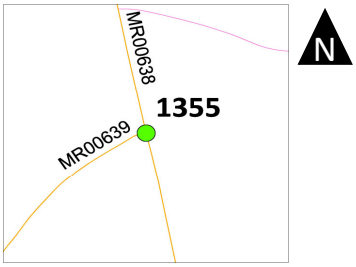
Station ID 1355

Intersection MR00639 / MR00638

Local Municipality Amahlati

District Municipality Amathole

Date: 2015-05-11



Enumerator: Nicholas Masiphula **Co-ord :** X 27.27867 Y -32.61530

Volumes per movement

Direction	NB				WB				SB				EB				TOTAL
Link ID	1060193				1060352				No Road				1060354				
Road Name	MR00639				MR00638								MR00638				
Movement	Left	Through	Right	**Total**	Left	Through	Right	**Total**	Left	Through	Right	**Total**	Left	Through	Right	**Total**	
M'ment ID	1	2	3		4	5	6		7	8	9		10	11	12		
12-hr																	
12-hr car	7	0	2	**9**	1	46	0	**47**	0	0	0	**0**	0	46	7	**53**	109
12-hr taxi	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	0	0	0	**0**	1
12-hr bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
12-hr HV	2	0	0	**2**	0	2	0	**2**	0	0	0	**0**	0	2	2	**4**	8
12-hr all veh	**9**	**0**	**2**	**11**	**1**	**49**	**0**	**50**	**0**	**0**	**0**	**0**	**0**	**48**	**9**	**57**	**118**
AM peak hr																	
AM peak car	1	0	2	**3**	1	16	0	**17**	0	0	0	**0**	0	4	4	**8**	28
AM peak taxi	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	0	0	0	**0**	1
AM peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
AM peak HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
AM peak all veh	**1**	**0**	**2**	**3**	**1**	**17**	**0**	**18**	**0**	**0**	**0**	**0**	**0**	**4**	**4**	**8**	**29**
OFF peak hr																	
OFF peak car	0	0	0	**0**	0	3	0	**3**	0	0	0	**0**	0	5	1	**6**	9
OFF peak HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
OFF peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
OFF peak taxi	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	0	1	1	**2**	3
OFF peak all veh	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**6**	**2**	**8**	**12**
PM peak hr																	
PM peak car	2	0	0	**2**	0	5	0	**5**	0	0	0	**0**	0	8	0	**8**	15
PM peak HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak all veh	**2**	**0**	**0**	**2**	**0**	**5**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**8**	**15**
ADT (24-hr)																	
24-hr car	7	0	2	**10**	1	49	0	**50**	0	0	0	**0**	0	49	7	**56**	116
24-hr taxi	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	0	0	0	**0**	1
24-hr bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
24-hr HV	2	0	0	**10**	0	2	0	**51**	0	0	0	**0**	0	2	2	**56**	117
24-hr all veh	**10**	**0**	**2**	**12**	**1**	**52**	**0**	**53**	**0**	**0**	**0**	**0**	**0**	**51**	**10**	**61**	**126**

Volumes per approach link (2-way)

	NB	WB	SB	EB
Link ID	1060193	1060352	No Road	1060354
ADT	22	106	0	122
% HV	19%	4%	-	7%

RRAMS INTERSECTION TRAFFIC COUNT OUTPUT

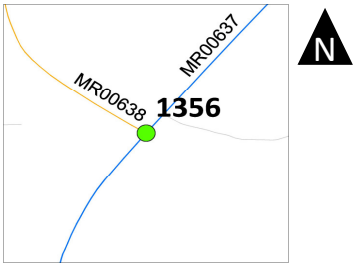
Station ID 1356

Intersection MR00638 / MR00637

Local Municipality Amahlati

District Municipality Amathole

Date: 2015-05-12



Enumerator: Nicholas Masiphula **Co-ord :** X 27.27867 Y -32.61530

Volumes per movement

Direction	NB				WB				SB				EB				TOTAL
Link ID	No Road				1060839				1059849				1059841				
Road Name					MR00637				MR00638				MR00637				
Movement	Left	Through	Right	**Total**	Left	Through	Right	**Total**	Left	Through	Right	**Total**	Left	Through	Right	**Total**	
M'ment ID	1	2	3		4	5	6		7	8	9		10	11	12		
12-hr																	
12-hr car	0	0	0	**0**	0	269	5	**274**	4	0	42	**46**	45	226	0	**271**	591
12-hr taxi	0	0	0	**0**	0	22	1	**23**	1	0	2	**3**	5	13	0	**18**	44
12-hr bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
12-hr HV	0	0	0	**0**	0	13	0	**13**	3	0	1	**4**	4	17	0	**21**	38
12-hr all veh	**0**	**0**	**0**	**0**	**0**	**304**	**6**	**310**	**8**	**0**	**45**	**53**	**54**	**256**	**0**	**310**	**673**
AM peak hr																	
AM peak car	0	0	0	**0**	0	77	3	**80**	1	0	6	**7**	7	50	0	**57**	144
AM peak taxi	0	0	0	**0**	0	6	1	**7**	0	0	1	**1**	2	6	0	**8**	16
AM peak bus	0	0	0	**0**	0	0	0	**0**	0	0	6	**6**	0	0	0	**0**	6
AM peak HV	0	0	0	**0**	0	1	0	**1**	0	0	6	**6**	2	5	0	**7**	14
AM peak all veh	**0**	**0**	**0**	**0**	**0**	**84**	**4**	**88**	**1**	**0**	**19**	**20**	**11**	**61**	**0**	**72**	**180**
OFF peak hr																	
OFF peak car	0	0	0	**0**	0	29	1	**30**	1	0	11	**12**	8	29	0	**37**	79
OFF peak HV	0	0	0	**0**	0	2	0	**2**	1	0	0	**1**	0	1	0	**1**	4
OFF peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
OFF peak taxi	0	0	0	**0**	0	2	0	**2**	0	0	1	**1**	0	4	0	**4**	7
OFF peak all veh	**0**	**0**	**0**	**0**	**0**	**33**	**1**	**34**	**2**	**0**	**12**	**14**	**8**	**34**	**0**	**42**	**90**
PM peak hr																	
PM peak car	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak HV	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak taxi	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
PM peak all veh	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
ADT (24-hr)																	
24-hr car	0	0	0	**0**	0	286	5	**291**	4	0	45	**49**	48	240	0	**288**	629
24-hr taxi	0	0	0	**0**	0	23	1	**24**	1	0	2	**3**	5	14	0	**19**	47
24-hr bus	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
24-hr HV	0	0	0	**0**	0	14	0	**316**	3	0	1	**52**	4	18	0	**307**	676
24-hr all veh	**0**	**0**	**0**	**0**	**0**	**323**	**6**	**330**	**9**	**0**	**48**	**56**	**57**	**272**	**0**	**330**	**716**

Volumes per approach link (2-way)

	NB	WB	SB	EB
Link ID	No Road	1060839	1059849	1059841
ADT	0	611	120	701
% HV	-	6%	7%	5%

ANNEXURE B

Origin / Destination Surveys – MR00639

Foxwood Dam TIA **Time : 06:00 - 18:00**

Number Plate Surveys In/Out **STN 1355 MR00639 / R344** **Name: Khungy**

In		In		Out		Out	
Time	Number Plate	Time	Number Plate	Time	Number Plate	Time	Number Plate
07:19	FPT 768 EC			07:46	HDY 962 EC		
07:39	FTV 798 EC			07:52	BLG 882 EC		
07:39	CZG 521 EC			08:11	HBB 082 EC		
07:43	BMH 421 EC			08:24	CZG 521 EC		
07:51	DBR 137 EC			08:58	FMD 739 EC		
09:02	FMJ 025 EC			10:12	HKX 265 EC		
11:18	HJJ 969 EC			14:25	CZG 521 EC		
11:49	HKX 265 EC			16:03	DKB 179 EC		
15:05	FMD 739 EC			16:44	HFH 589 EC		
15:55	HFH 589 EC			16:57	CVD 236 EC		
				17:45	CXN 187 EC		

Foxwood Dam TIA **Time : 06:00 - 18:00**

Number Plate Surveys In/Out **STN 1354 MR00639 / R63** **Name: Andie**

In		In		Out		Out	
Time	Number Plate	Time	Number Plate	Time	Number Plate	Time	Number Plate
06:36	DWP 237 EC			07:45	FTV 798 EC		
07:39	FVN 962 EC			07:45	CZG 521 EC		
07:40	HDY 962 EC			07:50	BMH 421 EC		
07:46	BLG 882 EC			08:01	DBR 137 EC		
08:03	HBB 082 EC			08:09	FVN 962 EC		
08:18	CZG 521 EC			08:19	HHG 896 EC		
08:32	DGN 047 EC			08:38	CA 290 938		
08:49	HHG 896 EC			09:09	FMJ 025 EC		
08:51	FMD 739 EC			09:43	DGN 047 EC		
09:21	FVN 962 EC			10:09	CXZ 452 EC		
10:04	HKX 265 EC			10:12	HHN 138 EC		
10:48	HHN 138 EC			11:25	HJJ 969 EC		
12:14	CA 290 938			11:55	HKX 265 EC		
12:30	FZF 763 EC			12:18	HCV 124 EC		
13:20	HCV 124 EC			12:23	FVN 962 EC		
14:19	FVN 962 EC			15:09	CLY 045 EC		
14:19	CZG 521 EC			15:11	FMD 739 EC		
15:41	HHF 886 EC			16:30	FVN 962 EC		
15:57	DKB 179 EC						
16:09	CLY 045 EC						
16:51	CVD 236 EC						
17:39	CXN 187 EC						

ANNEXURE C

Historical Daily Traffic Counts

TRAFFIC SURVEILLANCE SYSTEM

COMPREHENSIVE TRAFFIC OBSERVATIONS

Eastern Cape District Mun

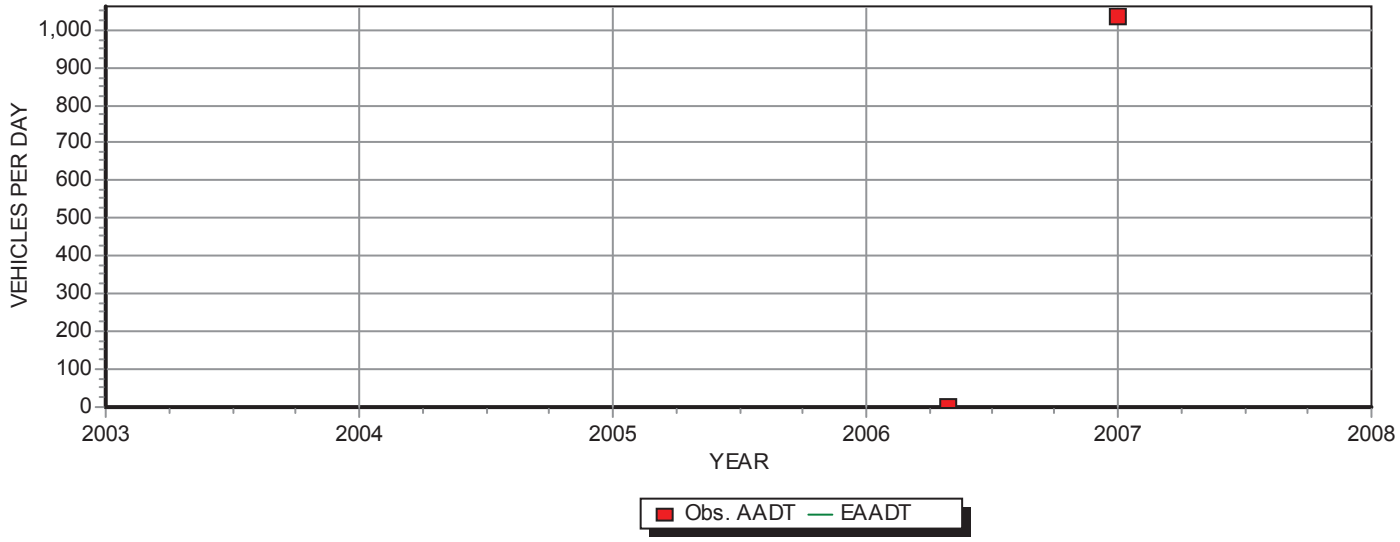
Site: 00622 Site Type: Secondary Latest Count: 2007/09/07 **Assessment Date :** 2007/01

Number	Site Name	Road/Street	Location Between	Lanes	Region	Rec. (hrs)
00622		R63	MR00639 - AM_Road 2062	2	AMATOLE	95

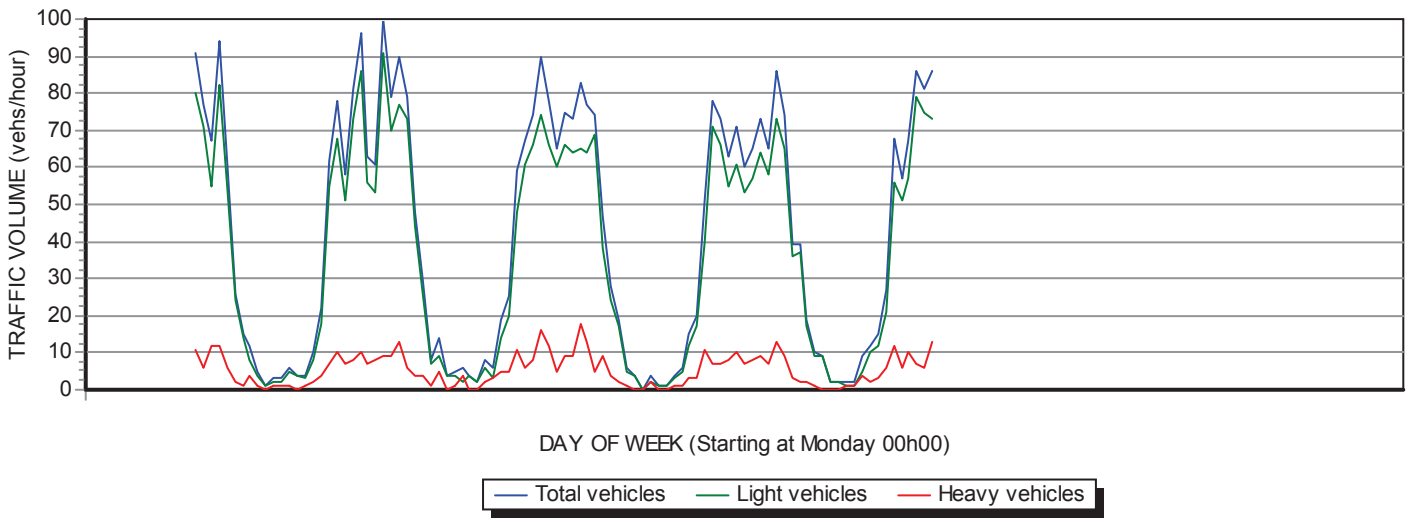
Daily Traffic		Speeds (km/h)		Road Loads and Growth	
AADT	1035	Speed limit	100.0	Ave axles / heavy	0.0
ADT	975	Arithmetic mean	0.0	Ave mass / heavy	0.0
ADHV	127	Arith mean, light	0.0	Ave mass/Short HV	0
AWDT	2,924	Arith mean, heavy	0.0	Ave mass/Med HV	0
Heavy Vehicle %	13.0	Harmonic mean	0.0	Ave mass/Long HV	0
Busses %	0.0	Exceed limit V %	0.0	Ave E80's / heavy	0.0
Heavy S M L %	0 0 0			ADE80 worst lane	0.0
Night Traffic %	15.4			Growth HV Avg Mass	0.00%
				Growth: linear est.	
				Growth: expon	
				Estimated if only vol data available	

Photo:

AADT Variations



TRAFFIC FLOW VARIATIONS
DURING AN AVERAGE WEEK



TRAFFIC SURVEILLANCE SYSTEM

COMPREHENSIVE TRAFFIC OBSERVATIONS

Eastern Cape Province

Site: 00622 Site Type: Secondary Latest Count: 2013/09/19 **Assessment Date :** 2013/01

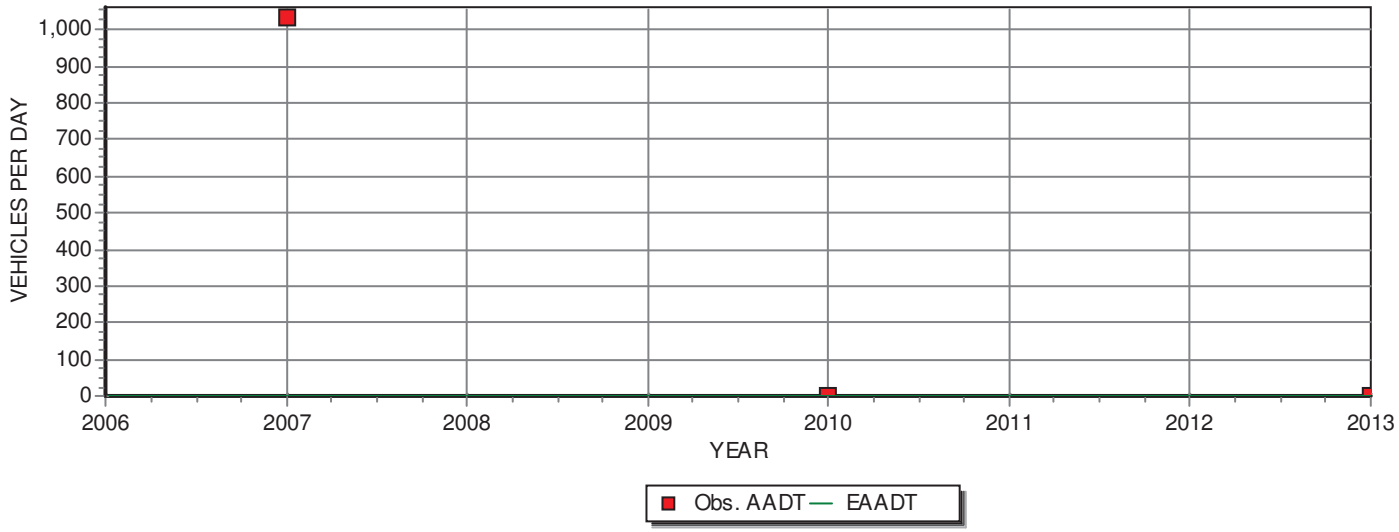
Number	Site Name	Road/Street	Location Between	Lanes	Region	Rec. (hrs)
00622		TR05701	MR00639 - DR02478	2	AMATOLE	68

Daily Traffic		Speeds (km/h)		Road Loads and Growth	
AADT	*	Speed limit	100.0	Ave axles / heavy	0.0
ADT	1059	Arithmetic mean	0.0	Ave mass / heavy	0.0
ADHV	178	Arith mean, light	0.0	Ave mass/Short HV	0.0
AWDT	1,059	Arith mean, heavy	0.0	Ave mass/Med HV	0.0
Heavy Vehicle %	17.4	Harmonic mean	0.0	Ave mass/Long HV	0.0
Busses %	0.0	Exceed limit V%	0.0	Ave E80's / heavy	0.0
Taxis %	0.0			ADE80 worst lane	0.0
Heavy S M L %	0 0 0			Growth HV Avg Mass	0.00%
Night Traffic %	17.4			Growth: linear est.	
				Growth: expon	
				Estimated if only vol data available	

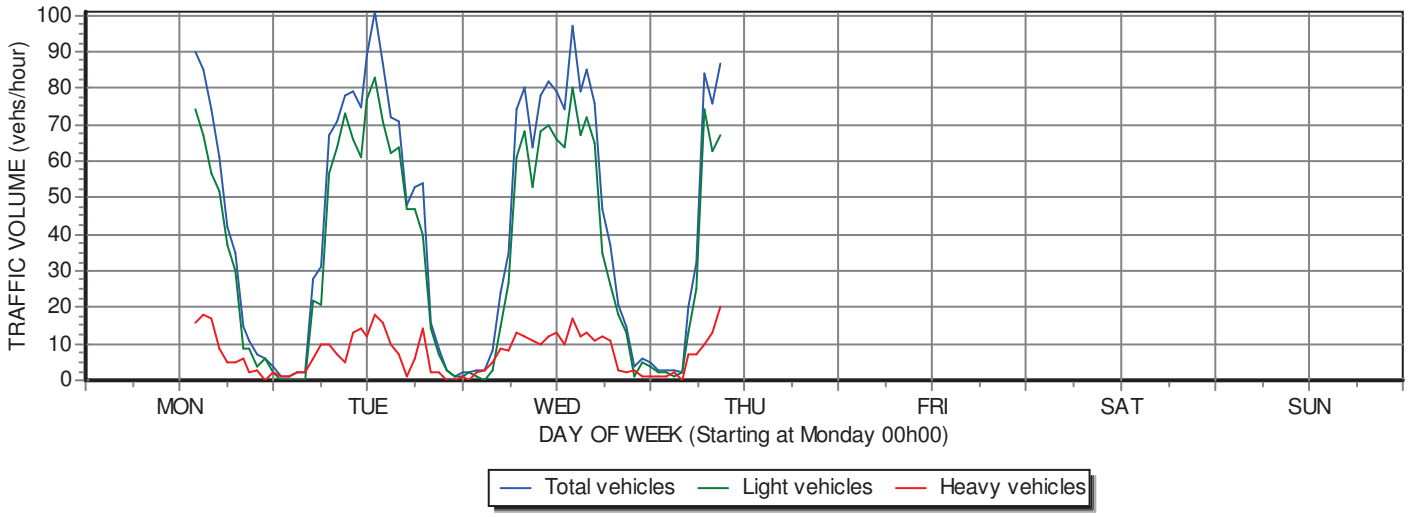
Photo:

* = Data not sufficient for accurate calculation.

AADT Variations



TRAFFIC FLOW VARIATIONS
DURING AN AVERAGE WEEK



TRAFFIC SURVEILLANCE SYSTEM

COMPREHENSIVE TRAFFIC OBSERVATIONS

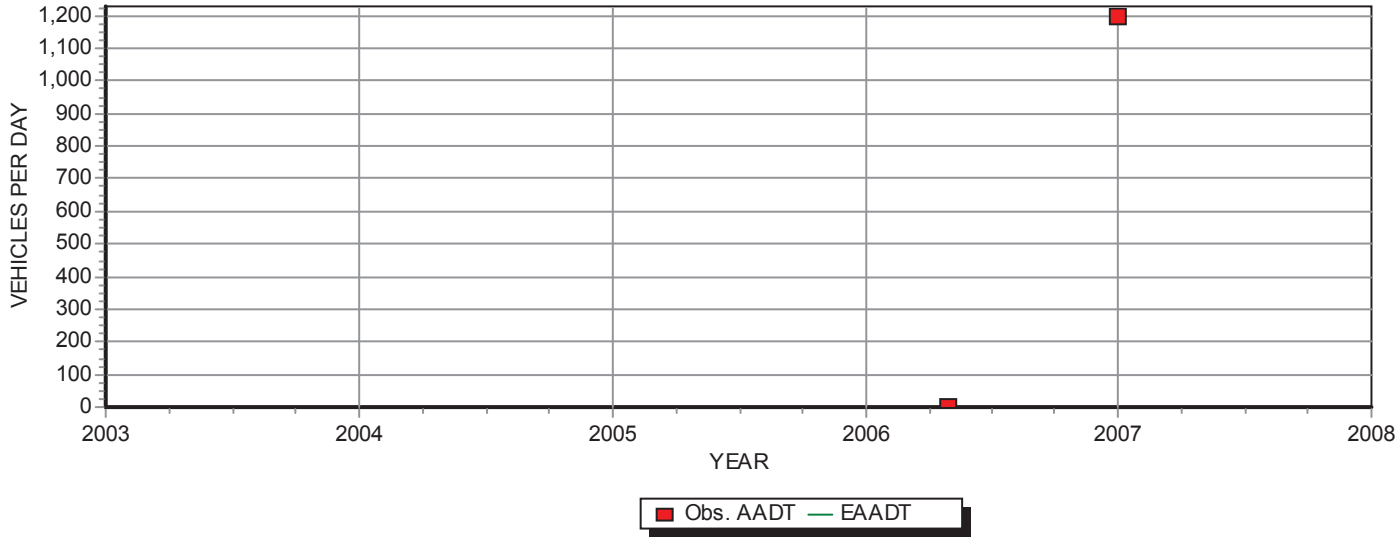
Eastern Cape District Mun

Site: 00633 Site Type: Secondary Latest Count: 2007/09/06 **Assessment Date :** 2007/01

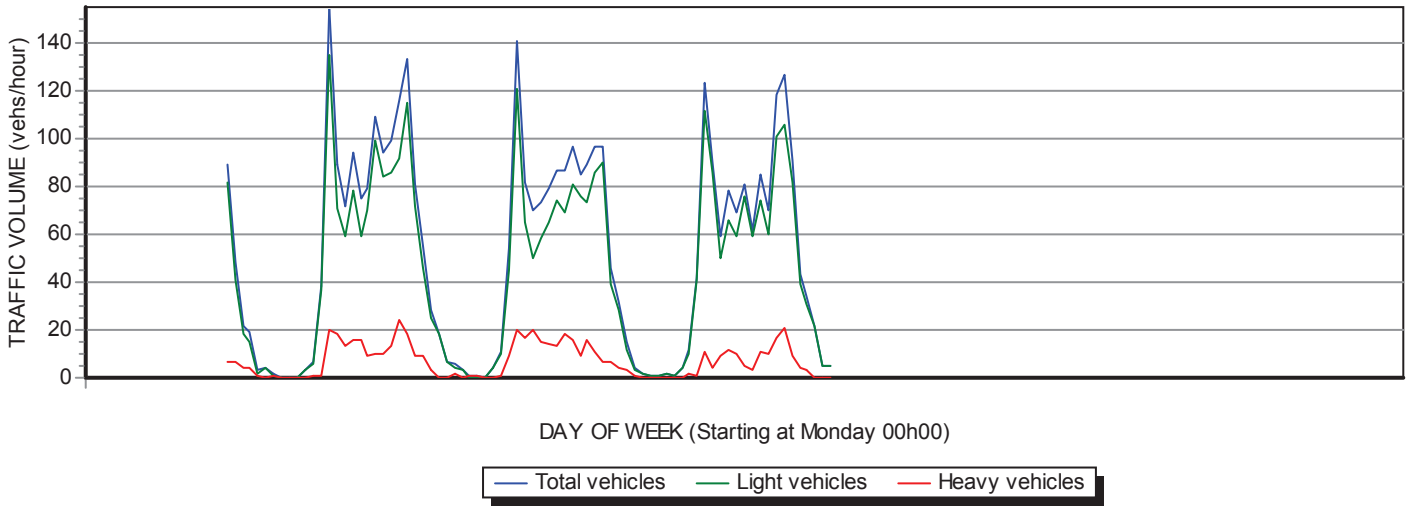
Number	Site Name	Road/Street	Location Between	Lanes	Region	Rec. (hrs)
00633		MR00637	MR00637 - AM_Road 2118	2	AMATOLE	78

Daily Traffic		Speeds (km/h)		Road Loads and Growth		Photo:
AADT	1198	Speed limit	80.0	Ave axles / heavy	0.0	
ADT	1281	Arithmetic mean	0.0	Ave mass / heavy	0.0	
ADHV	176	Arith mean, light	0.0	Ave mass/Short HV	0	
AWDT	3,842	Arith mean, heavy	0.0	Ave mass/Med HV	0	
Heavy Vehicle %	13.7	Harmonic mean	0.0	Ave mass/Long HV	0	
Busses %	0.0	Exceed limit V %	0.0	Ave E80's / heavy	0.0	
Heavy S M L %	0 0 0			ADE80 worst lane	0.0	
Night Traffic %	20.6			Growth HV Avg Mass	0.00%	
				Growth: linear est.		
				Growth: expon		
				Estimated if only vol data available		

AADT Variations



TRAFFIC FLOW VARIATIONS
DURING AN AVERAGE WEEK



TRAFFIC SURVEILLANCE SYSTEM

COMPREHENSIVE TRAFFIC OBSERVATIONS

Eastern Cape Province

Site: 00633 Site Type: Secondary Latest Count: 2013/09/19 **Assessment Date :** 2013/01

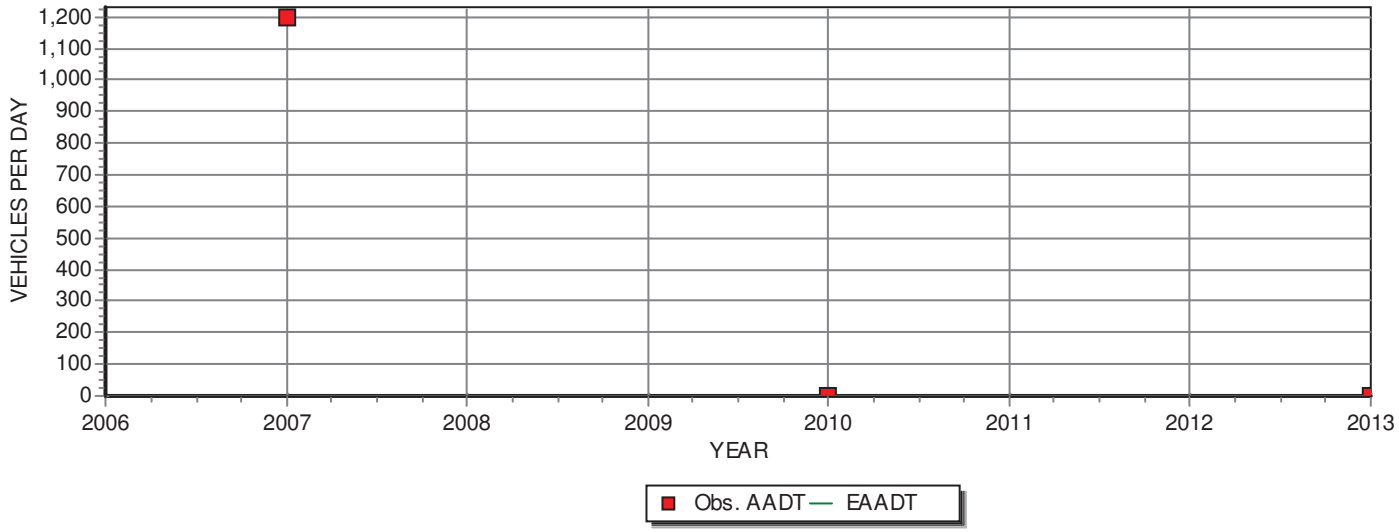
Number	Site Name	Road/Street	Location Between	Lanes	Region	Rec. (hrs)
00633		MR00637	MR00680 - DR02509	2	AMATOLE	67

Daily Traffic		Speeds (km/h)		Road Loads and Growth	
AADT	*	Speed limit	80.0	Ave axles / heavy	0.0
ADT	1318	Arithmetic mean	0.0	Ave mass / heavy	0.0
ADHV	285	Arith mean, light	0.0	Ave mass/Short HV	0.0
AWDT	1,318	Arith mean, heavy	0.0	Ave mass/Med HV	0.0
Heavy Vehicle %	22.1	Harmonic mean	0.0	Ave mass/Long HV	0.0
Busses %	0.0	Exceed limit V%	0.0	Ave E80's / heavy	0.0
Taxis %	0.0			ADE80 worst lane	0.0
Heavy S M L %	0 0 0			Growth HV Avg Mass	0.00%
Night Traffic %	17.1			Growth: linear est.	
				Growth: expon	
				Estimated if only vol data available	

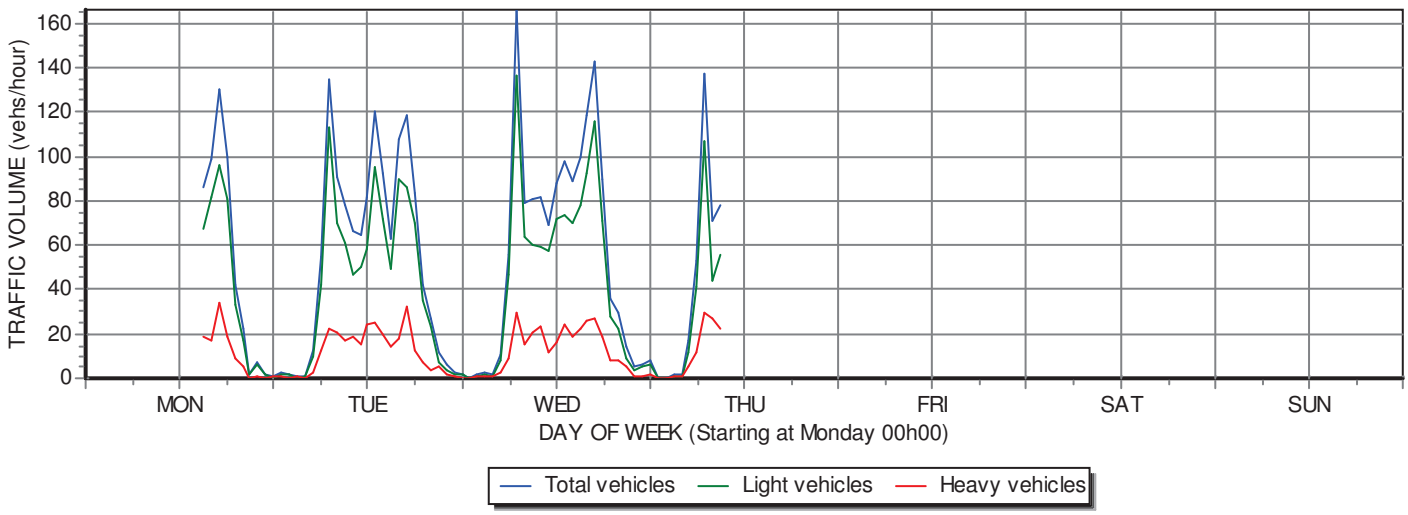
Photo:

* = Data not sufficient for accurate calculation.

AADT Variations



TRAFFIC FLOW VARIATIONS
DURING AN AVERAGE WEEK



TRAFFIC SURVEILLANCE SYSTEM

COMPREHENSIVE TRAFFIC OBSERVATIONS

Eastern Cape District Mun

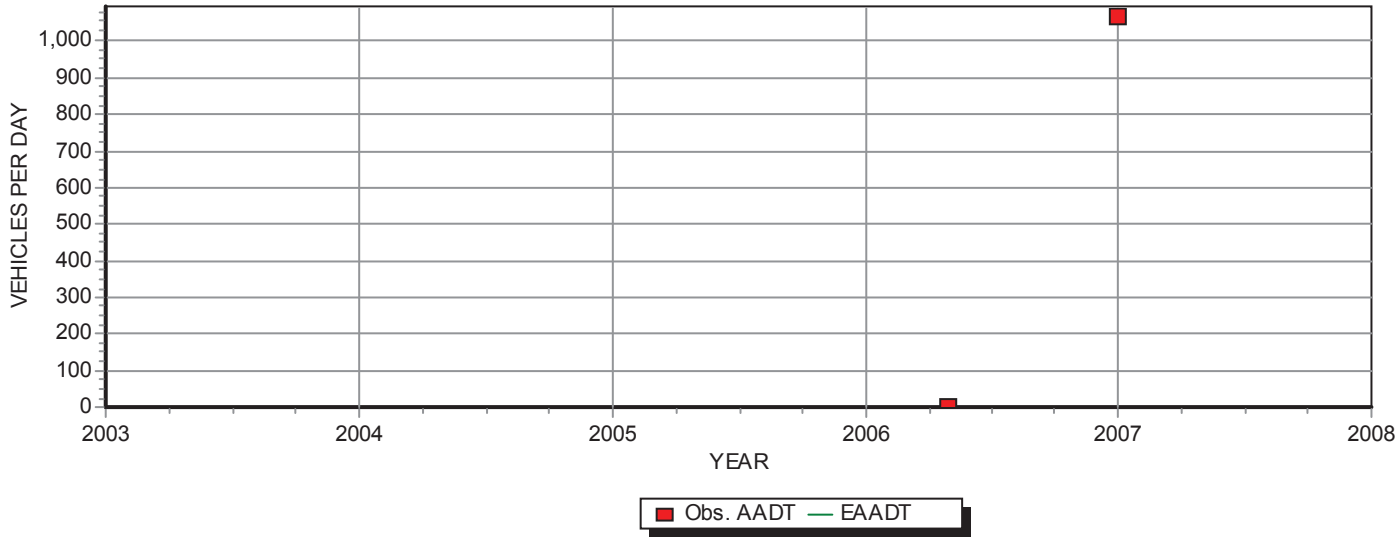
Site: 00644 Site Type: Secondary Latest Count: 2007/09/07 **Assessment Date :** 2007/01

Number	Site Name	Road/Street	Location Between	Lanes	Region	Rec. (hrs)
00644		TR05702	AM_Road 1430 - R63	2	AMATOLE	93

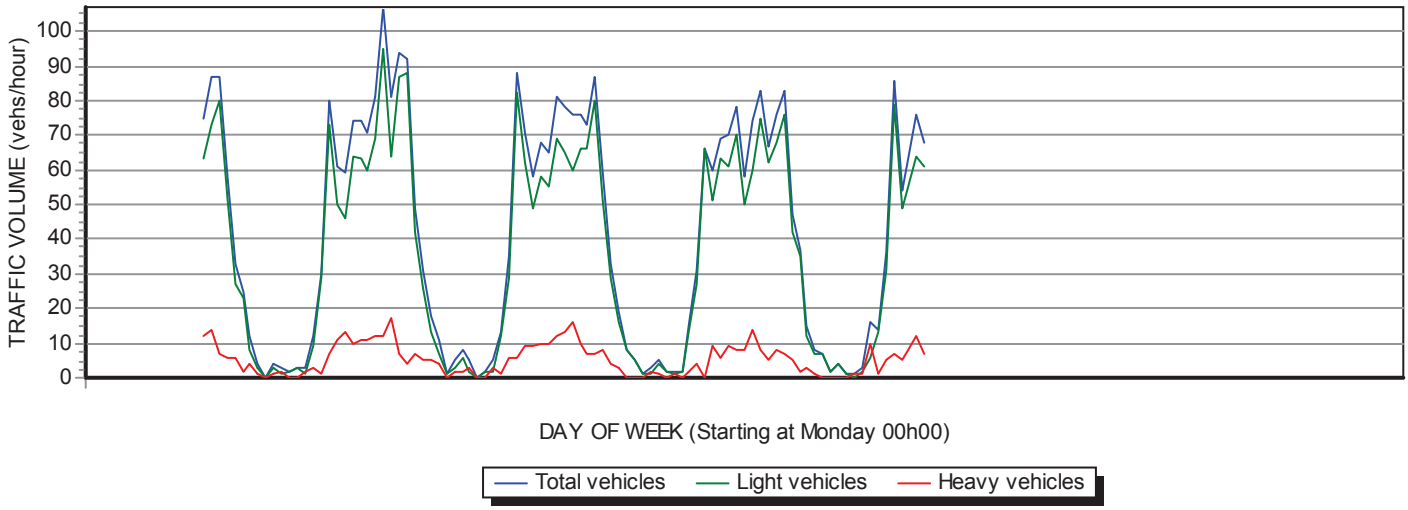
Daily Traffic		Speeds (km/h)		Road Loads and Growth	
AADT	1068	Speed limit	120.0	Ave axles / heavy	0.0
ADT	1007	Arithmetic mean	0.0	Ave mass / heavy	0.0
ADHV	130	Arith mean, light	0.0	Ave mass/Short HV	0
AWDT	3,020	Arith mean, heavy	0.0	Ave mass/Med HV	0
Heavy Vehicle %	13.0	Harmonic mean	0.0	Ave mass/Long HV	0
Busses %	0.0	Exceed limit V %	0.0	Ave E80's / heavy	0.0
Heavy S M L %	0 0 0			ADE80 worst lane	0.0
Night Traffic %	16.1			Growth HV Avg Mass	0.00%
				Growth: linear est.	
				Growth: expon	
				Estimated if only vol data available	

Photo:

AADT Variations



TRAFFIC FLOW VARIATIONS
DURING AN AVERAGE WEEK



TRAFFIC SURVEILLANCE SYSTEM

COMPREHENSIVE TRAFFIC OBSERVATIONS

Eastern Cape Province

Site: 00644 Site Type: Secondary Latest Count: 2013/09/19 **Assessment Date :** 2013/01

Number	Site Name	Road/Street	Location Between	Lanes	Region	Rec. (hrs)
00644		TR05702	TR04801 - MR00633	2	AMATOLE	67

Daily Traffic

AADT	*
ADT	1122
ADHV	170
AWDT	1,122
Heavy Vehicle %	15.0
Busses %	0.0
Taxis %	0.0
Heavy S M L %	0 0 0
Night Traffic %	18.2

Speeds (km/h)

Speed limit	120.0
Arithmetic mean	0.0
Arith mean, light	0.0
Arith mean, heavy	0.0
Harmonic mean	0.0
Exceed limit V%	0.0

Road Loads and Growth

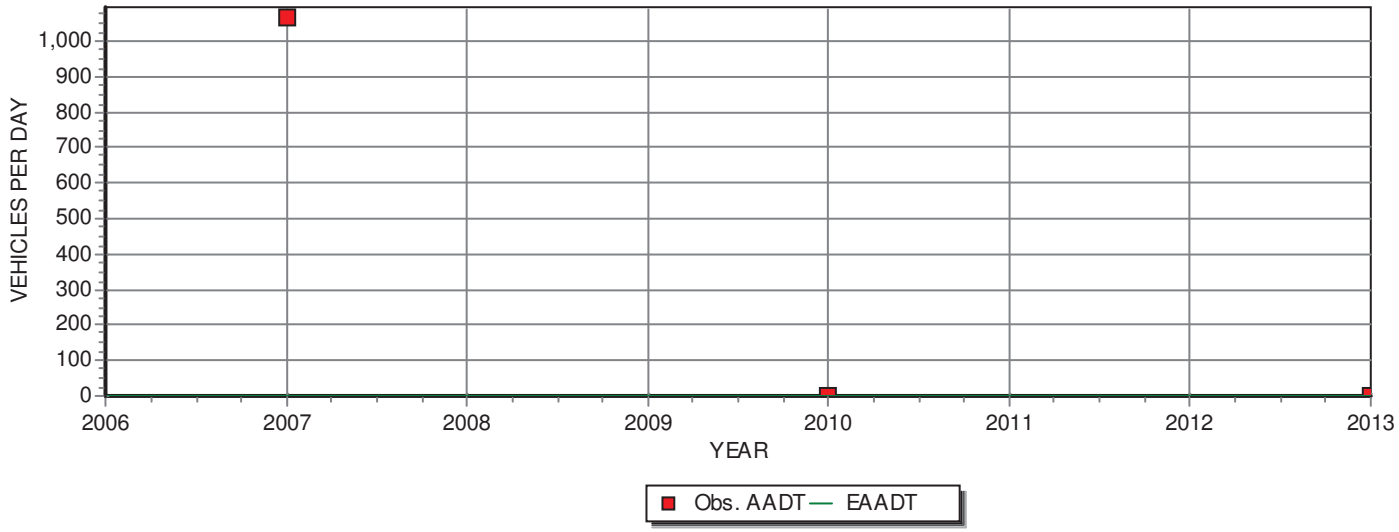
Ave axles / heavy	0.0
Ave mass / heavy	0.0
Ave mass/Short HV	0.0
Ave mass/Med HV	0.0
Ave mass/Long HV	0.0
Ave E80's / heavy	0.0
ADE80 worst lane	0.0
Growth HV Avg Mass	0.00%
Growth: linear est.	
Growth: expon	

Estimated if only vol data available

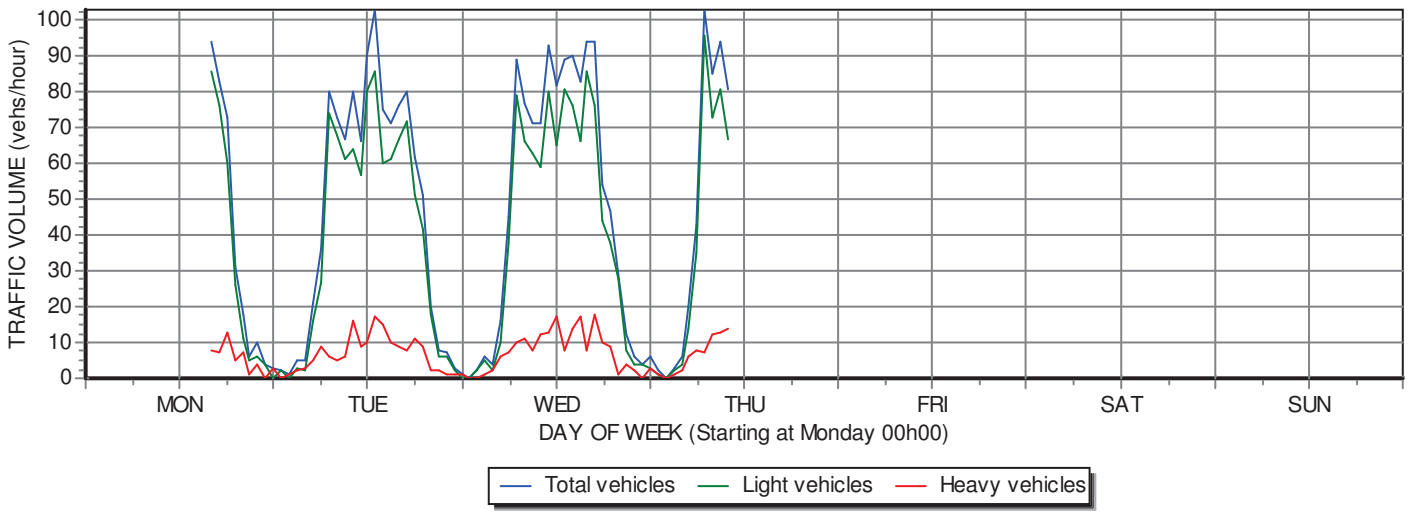
Photo:

* = Data not sufficient for accurate calculation.

AADT Variations



TRAFFIC FLOW VARIATIONS
DURING AN AVERAGE WEEK



ANNEXURE D

Methodology to Assess Identified Impacts

EVALUATION METHODS FOR ENVIRONMENTAL IMPACTS

The evaluation method for determining significance of impacts is shown below.[1]

Definitions of or criteria for environmental impact parameters

The significance of environmental impacts is a function of the environmental aspects that are present and to be impacted on, the probability of an impact occurring and the consequence of such an impact occurring before and after implementation of proposed mitigation measures.

(a) Extent (spatial scale):

Ranking criteria

L	M	H
Impact is localized within site boundary	Widespread impact beyond site boundary; Local	Impact widespread far beyond site boundary; Regional/national

Take into consideration:

- Access to resources; amenity
- Threats to lifestyles, traditions and values
- Cumulative impacts, including possible changes to land uses at and around the site.

(b) Duration:

Ranking criteria

L	M	H
Quickly reversible, less than project life, short term (0-5 years)	Reversible over time; medium term to life of project (5-15 years)	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

Take into consideration:

- Cost – benefit economically and socially (e.g. long or short term costs/benefits)

[1] (Adapted from T Hacking, AATS – Envirolink, 1998: An innovative approach to structuring environmental impact assessment reports. In: IAIA SA 1998 Conference Papers and Notes

(c) Intensity (severity):

Type of Criteria	Negative			Positive		
	H-	**M-**	**L-**	**L+**	**M+**	**H+**
Qualitative	Substantial deterioration, death, illness or injury, loss of habitat/diversity or resource, severe alteration or disturbance of important processes.	Moderate deterioration, discomfort, Partial loss of habitat/biodiversity/resource or slight or alteration	Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.	Minor improvement, restoration, improved management	Moderate improvement, restoration, improved management, substitution	Substantial improvement, substitution
Quantitative	Measurable deterioration Recommended level will often be violated (e.g. pollution)	Measurable deterioration Recommended level will occasionally be violated	No measurable change; Recommended level will never be violated	No measurable change; Within or better than recommended level.	Measurable improvement	Measurable improvement
Community response	Vigorous	Widespread complaints	Sporadic complaints	No observed reaction	Some support	Favourable publicity

Take into consideration:

- Cost – benefit economically and socially (e.g. high nett cost = substantial deterioration)
- Impacts on human-induced climate change
- Impacts on future management (e.g. easy/practical to manage with change or recommendation)

(d) Probability of occurrence:

Ranking criteria

L	**M**	**H**
Unlikely; low likelihood; Seldom No known risk or vulnerability to natural or induced hazards.	Possible, distinct possibility, frequent Low to medium risk or vulnerability to natural or induced hazards.	Definite (regardless of prevention measures), highly likely, continuous High risk or vulnerability to natural or induced hazards.

The specialist study must attempt to quantify the magnitude of impacts and outline the rationale used. Where appropriate, international standards are to be used as a measure of the level of impact.

(e) Status of the impact:

Describe whether the impact is positive, negative or neutral for each parameter. The ranking criteria are described in negative terms. Where positive impacts are identified, use the opposite, positive descriptions for criteria.

Based on a synthesis of the information contained in (a) to (e) above, the specialist will be required to assess the significance of potential impacts in terms of the following criteria:

(f) Significance: (Duration X Extent X Intensity)

Intensity = L				
Duration	**H**			
	M			Medium
	L	Low		
Intensity = M				
Duration	**H**			High
	M		Medium	
	L	Low		
Intensity = H				
Duration	**H**			
	M			High
	L	Medium		
		L	M	H
		Extent		

Positive impacts would be ranked in the same way as negative impacts, but result in high, medium or low positive consequence.

(g) Degree of confidence in predictions:

State the degree of confidence in the predictions, based on the availability of information and specialist knowledge.

(h) Significance Table Format:

Example of how significance tables should be formatted.

	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation							
With Mitigation							