

KONKOOSIES II PV FACILITY PRINCIPLES FOR TRAFFIC AND TRANSPORTATION MANAGEMENT

1. PURPOSE

The purpose of this traffic and transportation management plan (TMP) is to address regulatory compliance, traffic management practices, and protection measures to help reduce impacts related to transportation and the construction of temporary and long-term access within the vicinity of the project site. The objectives of this plan include the following:

- » To avoid incidents and accidents while vehicles are being driven and while transporting personnel, materials, and equipment to and from the project site.
- » To raise greater safety awareness in each driver and to ensure the compliance of all safe driving provisions for all the vehicles.
- » To raise awareness to ensure drivers respect and follow traffic regulations.
- » To ensure compliance with all legislation regulating traffic and transportation within South Africa.
- » To avoid the deterioration of access roads and the pollution that can be created due to noise and emissions produced by equipment, machinery, and vehicles.

2. RELEVANT ASPECTS OF THE PROJECT

Konkoosies II Photovoltaic Power Plant is located to the east of Konkoosies I Photovoltaic Power Plant, in close proximity to Eskom's Paulputs substation. Access to the plant is via a gravel road, which is the link to the town of Pofadder. There are two possible access routes to the facility site from the N14, these are via the R358 and R-2 gravel roads (33km) or via the R-1 and R2 (28km, 6km of which is gravel).

The main source of additional traffic that will travel on the National Roads (N14) as a result of the Photovoltaic Power Plant construction will be the delivery vehicles. There is also additional traffic from personnel travelling to site on a daily basis. The anticipated traffic loads on the roads in the area is significantly less than the design capacity of these roads. With this in mind, the traffic volumes contributed by the construction and operation phases of the Photovoltaic Power Plant on the existing traffic volumes are considered insignificant.

3. TRAFFIC AND TRANSPORTATION MANAGEMENT PRINCIPLES

- » Prior to the commencement of construction the contractor must develop their own Transport Management Plan (TMP) based on the requirements laid out in this plan.
- » The contractor must ensure that all required permits for the transportation of abnormal loads are in place prior to the transportation of equipment and project components to the site. Specific abnormal load routes must be developed with environmental factors taken into consideration.
- » Before construction commences, authorised access routes must be clearly marked in the field with signs or flagging. The Construction Contractor must review the location of designated access and will be responsible for ensuring construction travel is limited to designated routes. The entrance of the main access road must not be constructed before a blind rise or on a bend of the public road.
- » All employees must attend an environmental induction on site. Through this induction, employees will be instructed to use only approved access roads, and obey jurisdictional and posted speed limits to minimise potential impacts to the environment and other road users.
- » The contractor will be responsible for making sure that their suppliers, vendors, and subcontractors strictly comply with the principles of this TMP and the contractor's TMP.
- » Adjacent landowners must be notified of the construction schedule.
- » Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users.
- » Signs must be posted in the project area to notify landowners and others of the construction activity.
- » Flagging must be provided at access points to the site and must be maintained until construction is completed on the site.
- » Speed limits must be established and enforced over all construction traffic.
- » Speed controls and implementation of appropriate dust suppression measures must be enforced to minimise dust pollution.
- » Throughout construction the contractor will be responsible for monitoring the condition of access roads used by project traffic and for ensuring that roads are maintained in a condition that is comparable to the condition they were in before the construction began.
- » Drivers must have an appropriate valid driver's license.
- » All vehicles must be maintained in good mechanical, electrical, and electronic condition, including but not limited to the brake systems, steering, tires, windshield wipers, side mirrors and rearview mirror, safety belts, signal indicators, and lenses.
- » Any traffic delays attributable to construction traffic must be co-ordinated with the appropriate authorities.

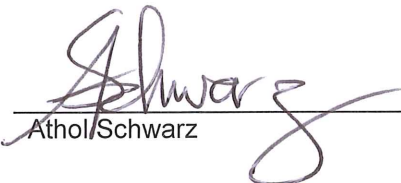
- » No deviation from approved transportation routes must be allowed, unless roads are closed for reasons outside the control of the contractor.
- » Impacts on local communities must be minimised. Consideration should be given to limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time.

4. MONITORING

- » The principal contractor must ensure that all vehicles adhere to the speed limits. Repeat offenders must be penalised. A speeding register must be kept with details of the offending driver.
- » Where traffic signs are not being adhered to, engineering structures must be used to ensure speeds are reduced.

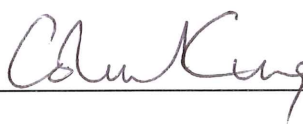
**BioTherm Energy (Pty) Ltd
Konkoonsies II Photovoltaic Power Plant**

Traffic Assessment

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1. Introduction

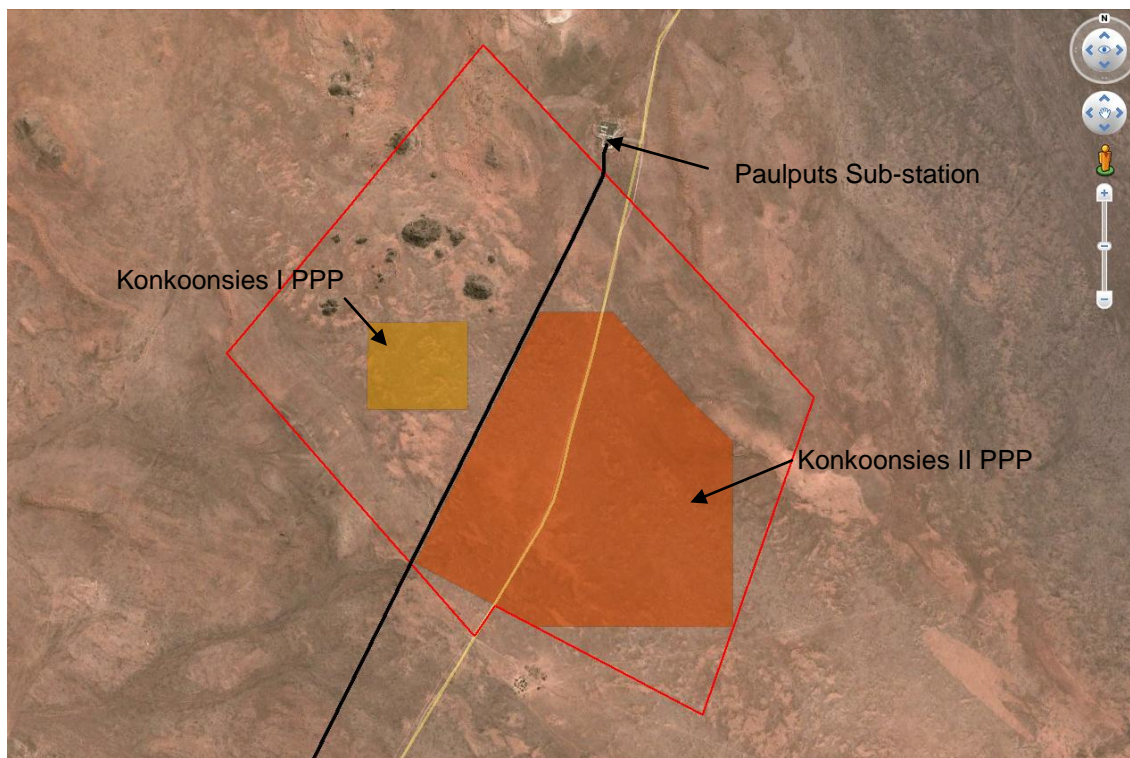
BioTherm Energy (Pty) Ltd requested Hatch Africa (Pty) Ltd to evaluate the impact of the traffic associated with the construction and operation of the proposed 75 MW Konkoonsies II Photovoltaic Power Plant in the area.

Konkoonsies II Photovoltaic Power Plant is located to the east of Konkoonsies I Photovoltaic Power Plant, in close proximity to Eskom's Paulputs substation. Access to the plant is via a gravel road, which is the link to the town of Pofadder.

The document addresses only the impact of the traffic volume on the National Road (N14) associated with the construction and operation of Konkoonsies II Photovoltaic Power Plant and does not address the traffic volumes or geometric design of the divisional and minor roads en route to the Konkoonsies II Photovoltaic Power Plant.

2. Site Location

Konkoonsies II Photovoltaic Power Plant is located to the east of Konkoonsies I Photovoltaic Power Plant, as shown on the Google Earth image provided below. Konkoonsies II Photovoltaic Power Plant is located approximately 30 km north-east of the town Pofadder in the Northern Cape Province of South Africa.



The Eskom Sub-Station (Paulputs) is approximately 1,5 km north of the Konkoonsies II Photovoltaic Power Plant.

3. Road Network

The road network around the Konkooisies II Photovoltaic Power Plant (PPP) is displayed in the image below and consists of the National Road (N14), Divisional Road (R358), Minor Road (R-1) and Minor Road (R-2). The road numbers for the minor roads are not official road numbers.



There are two possible access routes to the Konkooisies II Photovoltaic Power Plant from the National Road (N14). These are:

- via intersection 'A' and following roads R358 (11 km) and R-2 (22 km). The total length of this road is 33 km, the entire length of this road is gravel, or
- via intersection 'B' and following roads R-1 (22 km) and R-2 (6 km). The total length of this road is 28 km, of which only the last 6 km is gravel.

The distance between the intersections 'A' and 'B' is approximately 45 km. The travelling distance from Pofadder to the Konkooisies II PPP, via the R358, is in the order of 33 km (travelling time is expected to be in the order of 50 minutes), and the travelling distance from Pofadder to the Konkooisies II PPP, via R-1a, is in the order of 73 km (travelling time is expected to be in the order of 52 minutes). However, the travelling distance from Kakamas side to the Konkooisies II PPP is 78 km shorter via road R-1a than via R358. However, the quality of the ride via road R-1a is more superior.

3.1 National Road – N14

The National Road - N14, extends from Springbok in the Northern Cape to Brakfontein Interchange (N1/N14/R28) in Gauteng, and passes through the town of Pofadder.

This is a single carriageway paved road with paved shoulders as shown in the image below.



The road is approximately 8 m wide and is located within a 45 m wide road reserve. The speed limit of the road is 120 km/h.

The design criteria for this road are not known. However, since this is a major rural road, it will be classified as a Category B road; thus, in accordance with TRH-4 – Structural design of flexible pavement for interurban and rural roads, the road would have been designed for a minimum daily traffic volume exceeding 600 equivalent vehicles units.

3.2 Divisional Road – R358

The Divisional Road – R358, extends from Bitterfontein (on the N7) in the Northern Cape to Onseepkans (on the Namibia Border) in the Northern Cape, and passes through the town of Pofadder.

This is a single carriageway gravel road as shown in the image below. The condition of this road is good.



The road is approximately 10 m wide and located within a road reserve that varies between 20 to 50 m wide.

The design criteria for this road is not known. However, since this is an important rural gravel road, it will be classified as a Category D road; thus, in accordance with TRH-4 – Structural design of flexible pavement for interurban and rural roads, the road would have been designed for a minimum daily traffic volume not exceeding 500 equivalent vehicles units.

3.3 Minor Road R-1

The Minor Road R-1, extends from the National Road N14 (approximately 45 km north of Pofadder) to the Divisional Road R358 (approximately 6 km south of Onseepkans boarder post).

The first section of the road (R-1a), which is approximately 22 km long, is a single carriageway paved road with gravel shoulders as shown in the image below.



The road is approximately 6 m wide and is located within a 45 m wide road reserve.

The design criteria for this road is not known. However, since this is a rural road, it will be classified as a Category C road; thus, in accordance with TRH-4 – Structural design of flexible pavement for interurban and rural roads, the road would have been designed for a minimum daily traffic volume not exceeding 600 equivalent vehicles units.

The second section of the road (R-1b), is a single carriageway gravel road as shown in the image below.



3.4 Minor Road R-2

The Minor Road R-2, extends from the Divisional Road R358 (approximately 11 km north of Pofadder) to the Minor Road R-1 (approximately 22 km from N14). This is a single carriageway gravel road.

The design criteria for this road is not known. However, since this is a minor rural gravel road, it will be classified as a Category D road; thus, in accordance with TRH-4 – Structural design of flexible pavement for interurban and rural roads, the road would have been designed for a minimum daily traffic not exceeding 500 equivalent vehicles units.

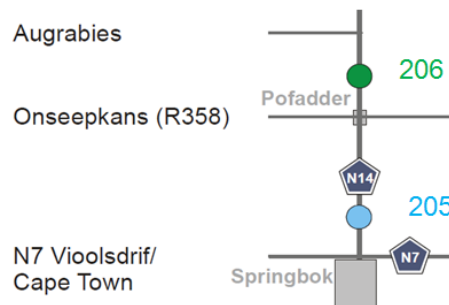
4. Existing Traffic Volumes

Data regarding the traffic volumes on the National Road (N14) was provided by Mikros Traffic Monitoring (Pty) Ltd. However, the most relevant counting stations are located to the west of Kakamas and east of Springbok.

Unfortunately, no traffic volume data is available for roads R358, R-1a and R-2.

4.1 Strip Diagram

The strip diagram for a section of the National Road (N14), as provided by SANRAL is indicated below. The strip diagram indicates the counting station either side of the town of Pofadder. Counting station 205 is located between Springbok and Pofadder, while counting station 206 is located between Pofadder and Kakamas.



4.2 Counting Station 205

Counting station 205 is a permanent counting station, which is located 2,5 km east of Springbok on the N14.

The traffic volume data for this counting station was provided by Mikros Traffic Monitoring (Pty) Ltd for 2009, 2010 and 2011. A summary of the information is tabled below and all the data is provided in Appendix A.

	North (to Pofadder)			South (to Springbok)		
	2009	2010	2011	2009	2010	2011
Total number of vehicles	221 726	214 762	220 281	218 320	210 959	217 548
Average daily traffic (ADT)	608	588	605	598	578	598
Average daily truck traffic (ADTT)	41	43	47	31	41	46
Percentage of trucks	6,7%	7,3%	7,8%	6,4%	7,1%	7,6
Truck split % (short:medium:long)	44:22:34	45:21:34	43:21:36	41:23:36	43:21:36	41:22:37
Percentage of night traffic (20:00 - 06:00)	15,2%	14,6%	13,9%	13,2%	12,4%	12,0%
Highest volume rate (vehicles/hour)	182	103	230	167	98	546

The traffic volume per hour for 2009 is extracted and summarised below, in order to compare with the information provided for counting station 206.

	North (to Pofadder)		South (to Springbok)	
	date	vehicles/hour	date	vehicles/hour
Highest volume	28 Feb 2009	182	28 Feb 2009	167
15 th highest volume	29 Jun 2009	83	28 Aug 2009	84
30 th highest volume	1 Sep 2009	78	28 Nov 2009	81

4.3 Counting Station 206

Counting Station 206 is a secondary counting station, which is located 11 km west of Kakamas on the N14.

The traffic volume data for this counting station was provided by Mikros Traffic Monitoring (Pty) Ltd. Since this is a secondary counting station, the data obtained is not continuous. Traffic volume data was only provided for the period 20 August 2009 to 9 September 2009 (477 hours). A summary of the information is tabled below and all the data is provided in Appendix B.

	North (to Kakamas)			South (to Pofadder)		
	2009			2009		
Total number of vehicles	5 114			5 573		
Average daily traffic (ADT)	257			281		
Average daily truck traffic (ADTT)	36			39		
Percentage of trucks	14,0%			13,9%		
Truck split % (short:medium:long)	35:30:35			40:32:28		
Percentage of night traffic (20:00 - 06:00)	10,9%			10,6%		
Highest volume rate (vehicles/hour)	53			49		

The traffic volume per hour is extracted and summarised below.

	North (to Kakamas)		South (to Pofadder)	
	date	vehicles/hour	date	vehicles/hour
Highest volume	26 Aug 2009	53	26 Aug 2009	49
15 th highest volume	4 Sep 2009	28	31 Aug 2009	33
30 th highest volume	8 Sep 2009	26	25 Aug 2009	30

4.4 Onseepkans Border Post

The traffic data for vehicles moving through the border post at Onseepkans, for 2010 and 2011, was obtained from the South African Revenue Services in Springbok, and is summarised in the table below.

	North (Departures)		South (Arrivals)	
	2010	2011	2010	2011
Total number of vehicles/year	1 958	1 990	1 697	1 658
Average daily traffic (ADT)	6	6	6	6

5. Expected Traffic Volumes

The expected number of vehicles travelling to the Photovoltaic Power Plant will be more intensive during the construction phase of the project, than during the operational phase.

The duration of the construction phase of this project is in the order of 15 to 18 months, and the operational phase is envisaged to be in the order of 20 years.

During the constructional phase of the project, the envisaged traffic on the road will include delivery of material and equipment and transportation of personnel.

Based on information obtained from similar size projects, the major components that are to be delivered to site and expected number of trips are as follows;

- photovoltaic panels - ±500 containers,
- structural elements for construction of the tables - ±160 truck loads, and
- inverters and other - ±60 containers.

The photovoltaic panels and inverters are to be imported from overseas and will be transported in standard containers, while the structural elements for construction of the tables will be transported from local fabrication plants. Since it is unlikely that adequate on site storage facilities will be provided for the storage of these major components, it is envisaged that these components will be delivered to site over a period of 12 months. This implies that approximately 720 trips are to be made over a period of 12 months, this relates to an ADT of less than 2.

Once the columns are installed, construction of the tables and installation of the panels is a very labour intensive operation. Based on information obtained from similar size projects, the maximum expected number of personnel required to execute the work on site is in the order of 400. It is assumed that 75% will be transported to site in 50 seater buses, 10% will drive to site in light vehicles, while the other 15% will be passengers.



During the operational phase of the project, it is envisaged that a small maintenance team will travel to site on a daily basis.

5.1 Construction Phase

During the constructional phase of the project, the envisaged traffic on the road will include delivery of material and equipment and transportation of personnel.

The anticipated number of vehicles travelling to the Photovoltaic Power Plant during the construction phase of this project, is tabled below, together with the envisaged increase in the average daily traffic (ADT).

Vehicle Category	Personnel	Equipment and Material
Light vehicles (GVM < 3 500 kg)	40	
Medium vehicles (GVM 3 500 – 16 000 kg)	7	
Heavy vehicles (GVM > 16000 kg)		2
ADT (% light, medium, heavy)	49 (82%:14%:4%)	

5.2 Operational Phase

During the operational phase of the project, it is envisaged that a small maintenance team will travel to site on a daily basis. It is assumed that 2 light vehicles and a small bus will be used to convey the staff to site. This would imply that the ADT on the roads to the site would increase by three.

6. Data Interpretation

6.1 Counting Station Comparison

Based on the traffic volume data provided for counting stations 205 and 206, the increase in traffic volume on the National Road N14 due to the construction of the Photovoltaic Power Plant can be determined. Since there is no traffic volume data for the minor roads en route to the Photovoltaic Power Plant, the impact on the traffic volumes will have to be surmised.

Considering the traffic volume data provided for counting stations 205 and 206, the first glaring anomaly is the disparity of ADT between the two counting stations. Based on the 2009 values only 42% of the vehicles, travelling north, which passed counting station 205, passed through counting station 206 and 53% more vehicles, travelling south, passed counting station 205 than what passed through counting station 206. This implies that, on average, 55% of the all traffic passing through counting station 205 does not pass through counting station 206.

To verify the large percentage of traffic passing through counting station 205 that does not pass through counting station 206 (as identified above), the highest traffic volume per hour from counting station 206 was compared with the traffic volumes per hour from counting station 205, on approximately the same dates as those indentified for counting station 206. The results of the comparison is as follows; of the vehicles, travelling north, only 68% which passed counting station 205, passed counting station 206, and 58% more traffic travelling south passed counting station 205 than counting station 206. This implies that, on average, 37% of the traffic passing counting station 205 does not pass through counting station 206.

This anomaly results from the volume of data collected at counting station 206, as there is a poor correlation between the two counting stations. Based on the poor correlation, only traffic volume data from counting station 205 is used in this study.

6.2 Traffic Volumes on National Roads

The only additional traffic, that will travel on the National Roads (N14) as a result of the Photovoltaic Power Plant construction, will be the delivery vehicles. Based on the information provided above, the ADT will increase by less than 2. The following scenarios were considered;

- If all the material and equipment required on site was to be transported from Cape Town then the ADT at counting station 205 (northerly direction) will increase by 2. This implies that the ADT will increase by less than 0,5% and the ADTT will increase by 4,5%.
- If all the material and equipment required on site was to be transported from Johannesburg then the ADT at counting station 205 (southerly direction) will increase by 2. This implies that the ADT will increase by less than 0,5% and the ADTT will increase by 5%.

6.3 Traffic Volumes on Local Roads

Without the relevant traffic volume data for the minor roads en route to the Photovoltaic Power Plant, it is difficult to draw any substantial conclusion on the impact of the existing traffic. However, based on the information provided above, the anticipated ADT during the construction phase of the Photovoltaic Power Plant is in the order of 49, of which 82% will be light vehicles and only 4% will be heavy vehicles. If the existing ADT of these roads is in the order of 50, then the impact on the road will be doubled. This is still very low in comparison with the traffic volume that the road would have been designed to accommodate.

7. Conclusion

The N14 is a National Road and the anticipated 0,5% increase in the ADT is insignificant. This is further attenuated due to the fact that the vehicles do not all arrive at site at the same time.

The additional ADT of 49, on either roads R358 or R-1a, will result in an increase of more than 200%, might appear significantly high. However, the combined ADT on either of these roads is less than 100 vehicles per day.

The anticipated traffic loads on the roads in the area is significantly less than the design capacity of these roads. With this in mind, the traffic volumes contributed by the construction and operation phases of the Photovoltaic Power Plant on the existing traffic volumes are considered insignificant.

Appendix A

Counting Station 205



205

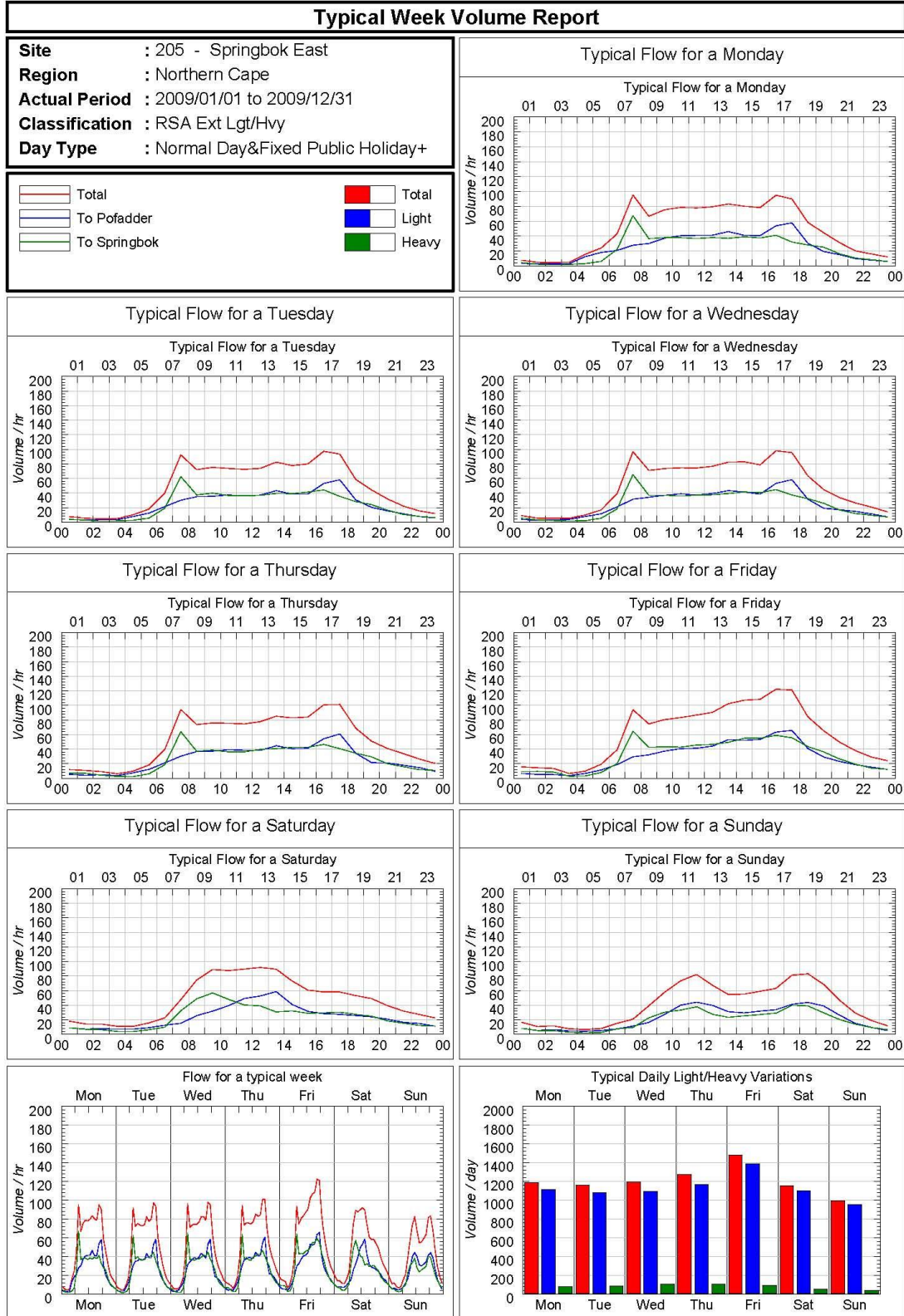
Springbok East

TRAFFIC HIGHLIGHTS OF SITE 205				
1.1	Site Identifier		205	
1.2	Site Name		Springbok East	
1.3	Site Description		Between Springbok and Pofadder	
1.4	Road Description	Route : N014 Road : N014 Section : 01	Distance : 2.5km	
1.5	GPS Position		17.912500E -29.654444S	
1.6	Number of Lanes		2	
1.7	Station Type		Permanent	
1.8	Requested Period		2009/01/01 - 2009/12/31	
1.9	Length of record requested (hours)		8760	
1.10	Actual First & Last Dates		2009/01/01 - 2009/12/31	
1.11	Actual available data (hours)		8760	
1.12	Percentage data available for requested period		100.0	
		To Pofadder	To Springbok	
			Total	
2.1	Total number of vehicles	221726	218320	440046
2.2	Average daily traffic (ADT)	608	598	1206
2.3	Average daily truck traffic (ADTT)	41	38	79
2.4	Percentage of trucks	6.7	6.4	6.6
2.5	Truck split % (short:medium:long)	44 : 22 : 34	41 : 23 : 36	43 : 22 : 35
2.6	Percentage of night traffic (20:00 - 06:00)	15.2	13.2	14.2
3.1	Speed limit (km/hr)			120
3.2	Average speed (km/hr)	98.5	108.0	103.2
3.3	Average speed - light vehicles (km/hr)	99.7	109.1	104.4
3.4	Average speed - heavy vehicles (km/hr)	82.6	90.7	86.5
3.5	Average night speed (km/hr)	97.6	107.2	102.0
3.6	15th centile speed (km/hr)	79.8	83.7	81.7
3.7	85th centile speed (km/hr)	119.9	132.0	126.0
3.8	Percentage vehicles in excess of speed limit	12.1	27.9	19.9
4.1	Percentage vehicles in flows over 600 vehicles/hr	0.0	0.0	0.0
4.2	Highest volume on the road (vehicles/hr)		2009/02/28 13:00:00	239
4.3	Highest volume in the North (vehs/hr)		2009/02/28 12:00:00	182
4.4	Highest volume in the South (vehs/hr)		2009/02/28 13:00:00	167
4.5	Highest volume in a lane (vehicles/hr)		2009/02/28 12:00:00	182
4.6	15th highest volume on the road (vehicles/hr)		2009/04/03 18:00:00	152
4.7	15th highest volume in the North direction (vehs/hr)		2009/06/29 17:00:00	83
4.8	15th highest volume in the South direction (vehs/hr)		2009/08/28 15:00:00	84
4.9	30th highest volume on the road (vehicles/hr)		2009/10/02 18:00:00	142
4.10	30th highest volume in the North direction (vehs/hr)		2009/09/01 18:00:00	78
4.11	30th highest volume in the South direction (vehs/hr)		2009/11/28 10:00:00	81
5.1	Percentage of vehicles less than 2s behind vehicle ahead	3.6	3.8	3.7
6.1	Total number of heavy vehicles	14850	14038	28888
6.2	Estimated average number of axles per truck	4.4	4.5	4.4
6.3	Estimated truck mass (Ton/truck)	25.3	26.0	25.7
6.4	Estimated average E80/truck	1.5	1.6	1.6
6.5	Estimated daily E80 on the road			123
6.6	Estimated daily E80 in the North direction			62
6.7	Estimated daily E80 in the South direction			61
6.8	Estimated daily E80 in the worst North lane			62
6.9	Estimated daily E80 in the worst South lane			61
6.10	ASSUMPTION on Axles/Truck (Short:Medium:Long)			(2.0 : 5.0 : 7.0)
6.11	ASSUMPTION on Mass/Truck (Short:Medium:Long)			(10.9 : 31.5 : 39.8)
6.12	ASSUMPTION on E80s/Truck (Short:Medium:Long)			(0.6 : 2.5 : 2.1)



205

Springbok East



Mikros Traffic Monitoring (Pty) Ltd (012) 804-1710

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205

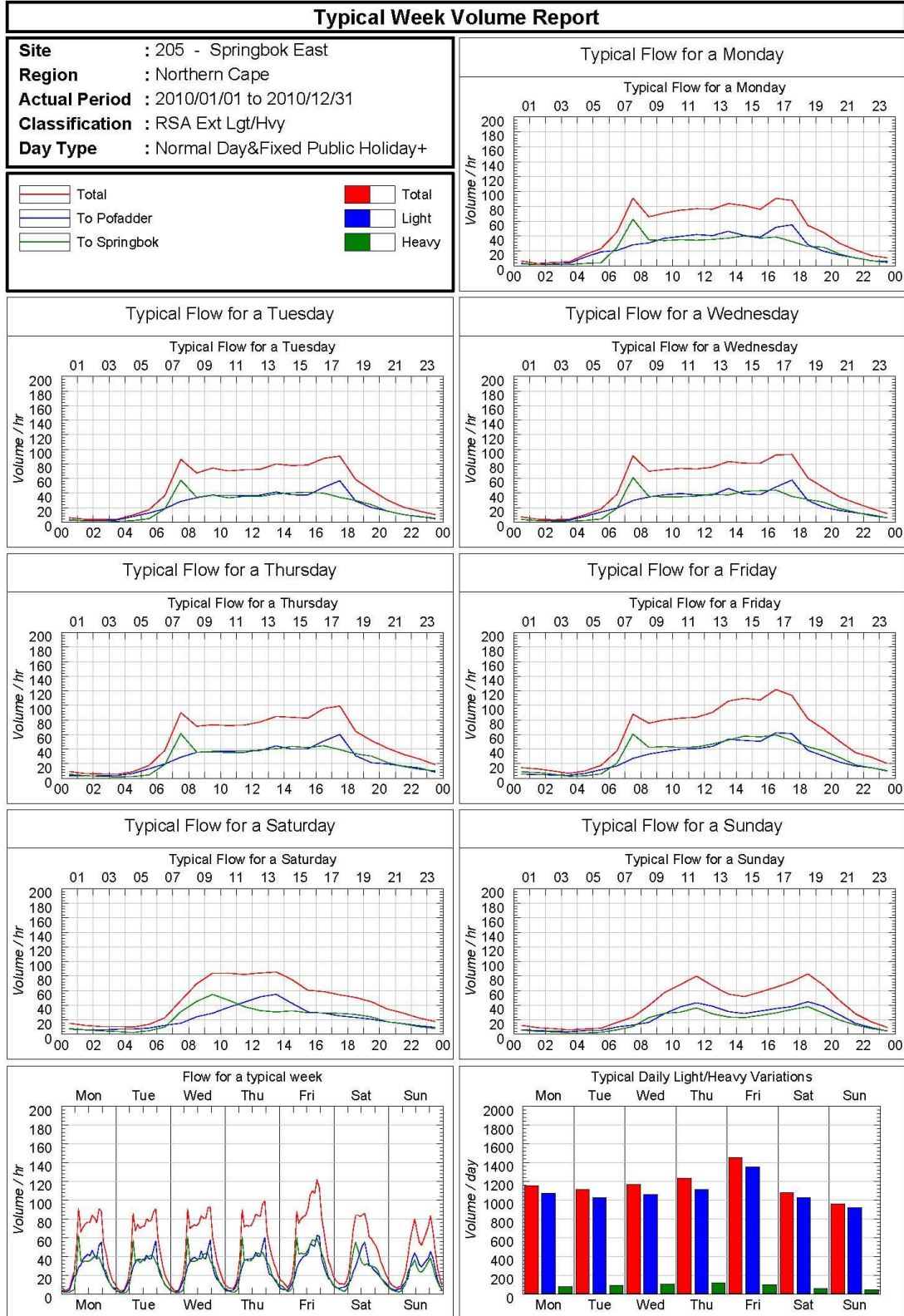
Springbok East

TRAFFIC HIGHLIGHTS OF SITE 205				
1.1	Site Identifier		205	
1.2	Site Name		Springbok East	
1.3	Site Description		Between Springbok and Pofadder	
1.4	Road Description	Route : N014 Road : N014 Section : 01	Distance : 2.5km	
1.5	GPS Position		17.912500E -29.654444S	
1.6	Number of Lanes		2	
1.7	Station Type		Permanent	
1.8	Requested Period		2010/01/01 - 2010/12/31	
1.9	Length of record requested (hours)		8760	
1.10	Actual First & Last Dates		2010/01/01 - 2010/12/31	
1.11	Actual available data (hours)		8760	
1.12	Percentage data available for requested period		100.0	
		To Pofadder	To Springbok	
			Total	
2.1	Total number of vehicles	214762	210959	425721
2.2	Average daily traffic (ADT)	588	578	1166
2.3	Average daily truck traffic (ADTT)	43	41	84
2.4	Percentage of trucks	7.3	7.1	7.2
2.5	Truck split % (short:medium:long)	45 : 21 : 34	43 : 21 : 36	44 : 21 : 35
2.6	Percentage of night traffic (20:00 - 06:00)	14.6	12.4	13.5
3.1	Speed limit (km/hr)			120
3.2	Average speed (km/hr)	98.5	108.4	103.4
3.3	Average speed - light vehicles (km/hr)	99.7	109.8	104.7
3.4	Average speed - heavy vehicles (km/hr)	82.8	90.2	86.4
3.5	Average night speed (km/hr)	97.7	107.3	102.0
3.6	15th centile speed (km/hr)	79.8	85.8	81.7
3.7	85th centile speed (km/hr)	119.9	132.0	126.0
3.8	Percentage vehicles in excess of speed limit	11.9	28.8	20.3
4.1	Percentage vehicles in flows over 600 vehicles/hr	0.0	0.0	0.0
4.2	Highest volume on the road (vehicles/hr)		2010/11/05 17:00:00	169
4.3	Highest volume in the North (vehs/hr)		2010/11/26 18:00:00	103
4.4	Highest volume in the South (vehs/hr)		2010/04/01 14:00:00	98
4.5	Highest volume in a lane (vehicles/hr)		2010/11/26 18:00:00	103
4.6	15th highest volume on the road (vehicles/hr)		2010/04/01 14:00:00	150
4.7	15th highest volume in the North direction (vehs/hr)		2010/09/23 17:00:00	81
4.8	15th highest volume in the South direction (vehs/hr)		2010/12/10 17:00:00	82
4.9	30th highest volume on the road (vehicles/hr)		2010/06/04 17:00:00	142
4.10	30th highest volume in the North direction (vehs/hr)		2010/04/01 16:00:00	77
4.11	30th highest volume in the South direction (vehs/hr)		2010/04/01 18:00:00	78
5.1	Percentage of vehicles less than 2s behind vehicle ahead	3.5	3.6	3.6
6.1	Total number of heavy vehicles	15694	14993	30687
6.2	Estimated average number of axles per truck	4.3	4.4	4.4
6.3	Estimated truck mass (Ton/truck)	25.1	25.6	25.4
6.4	Estimated average E80/truck	1.5	1.5	1.5
6.5	Estimated daily E80 on the road			128
6.6	Estimated daily E80 in the North direction			65
6.7	Estimated daily E80 in the South direction			63
6.8	Estimated daily E80 in the worst North lane			65
6.9	Estimated daily E80 in the worst South lane			63
6.10	ASSUMPTION on Axles/Truck (Short:Medium:Long)			(2.0 : 5.0 : 7.0)
6.11	ASSUMPTION on Mass/Truck (Short:Medium:Long)			(10.9 : 31.5 : 39.8)
6.12	ASSUMPTION on E80s/Truck (Short:Medium:Long)			(0.6 : 2.5 : 2.1)



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Springbok East



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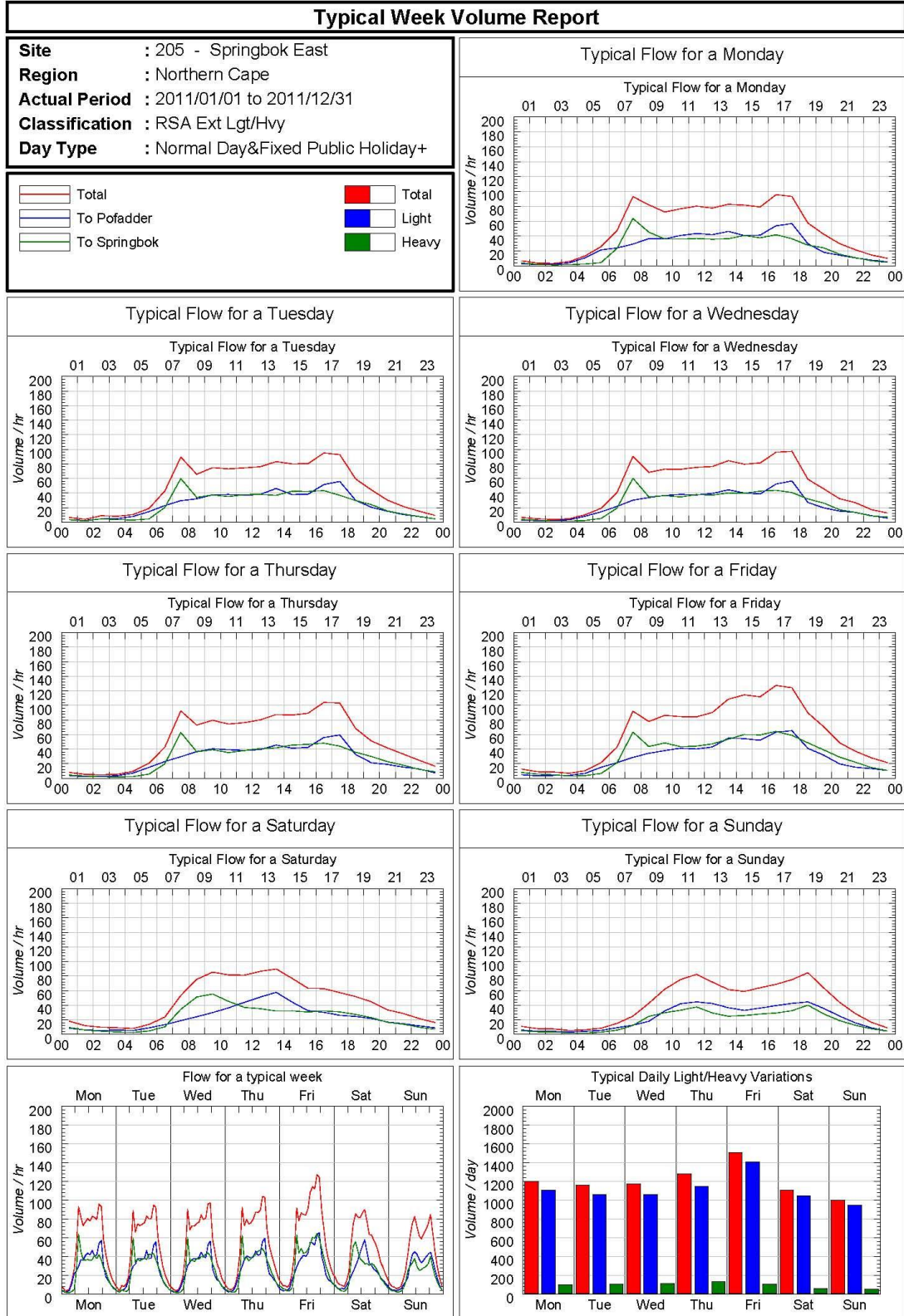
Springbok East

TRAFFIC HIGHLIGHTS OF SITE 205				
1.1	Site Identifier		205	
1.2	Site Name		Springbok East	
1.3	Site Description		Between Springbok and Pofadder	
1.4	Road Description	Route : N014 Road : N014 Section : 01	Distance : 2.5km	
1.5	GPS Position		17.912500E -29.654444S	
1.6	Number of Lanes		2	
1.7	Station Type		Permanent	
1.8	Requested Period		2011/01/01 - 2011/12/31	
1.9	Length of record requested (hours)		8760	
1.10	Actual First & Last Dates		2011/01/01 - 2011/12/31	
1.11	Actual available data (hours)		8736	
1.12	Percentage data available for requested period		99.7	
		To Pofadder	To Springbok	
			Total	
2.1	Total number of vehicles	220281	217548	437829
2.2	Average daily traffic (ADT)	605	598	1203
2.3	Average daily truck traffic (ADTT)	47	46	93
2.4	Percentage of trucks	7.8	7.6	7.7
2.5	Truck split % (short:medium:long)	43 : 21 : 36	41 : 22 : 37	42 : 21 : 37
2.6	Percentage of night traffic (20:00 - 06:00)	13.9	12.0	13.0
3.1	Speed limit (km/hr)			120
3.2	Average speed (km/hr)	98.5	107.9	103.2
3.3	Average speed - light vehicles (km/hr)	99.8	109.3	104.6
3.4	Average speed - heavy vehicles (km/hr)	82.8	90.2	86.4
3.5	Average night speed (km/hr)	97.4	107.7	102.1
3.6	15th centile speed (km/hr)	79.8	83.7	81.7
3.7	85th centile speed (km/hr)	119.9	132.0	126.0
3.8	Percentage vehicles in excess of speed limit	12.0	27.9	19.9
4.1	Percentage vehicles in flows over 600 vehicles/hr	0.0	0.0	0.2
4.2	Highest volume on the road (vehicles/hr)		2011/06/06 09:00:00	776
4.3	Highest volume in the North (vehs/hr)		2011/06/06 09:00:00	230
4.4	Highest volume in the South (vehs/hr)		2011/06/06 09:00:00	546
4.5	Highest volume in a lane (vehicles/hr)		2011/06/06 09:00:00	546
4.6	15th highest volume on the road (vehicles/hr)		2011/08/26 16:00:00	167
4.7	15th highest volume in the North direction (vehs/hr)		2011/11/25 17:00:00	88
4.8	15th highest volume in the South direction (vehs/hr)		2011/12/15 16:00:00	93
4.9	30th highest volume on the road (vehicles/hr)		2011/12/15 16:00:00	149
4.10	30th highest volume in the North direction (vehs/hr)		2011/09/30 17:00:00	80
4.11	30th highest volume in the South direction (vehs/hr)		2011/05/13 17:00:00	85
5.1	Percentage of vehicles less than 2s behind vehicle ahead	3.7	4.1	3.9
6.1	Total number of heavy vehicles	17196	16579	33775
6.2	Estimated average number of axles per truck	4.4	4.5	4.5
6.3	Estimated truck mass (Ton/truck)	25.6	26.0	25.8
6.4	Estimated average E80/truck	1.5	1.6	1.5
6.5	Estimated daily E80 on the road			144
6.6	Estimated daily E80 in the North direction			72
6.7	Estimated daily E80 in the South direction			71
6.8	Estimated daily E80 in the worst North lane			72
6.9	Estimated daily E80 in the worst South lane			71
6.10	ASSUMPTION on Axles/Truck (Short:Medium:Long)			(2.0 : 5.0 : 7.0)
6.11	ASSUMPTION on Mass/Truck (Short:Medium:Long)			(10.9 : 31.5 : 39.8)
6.12	ASSUMPTION on E80s/Truck (Short:Medium:Long)			(0.6 : 2.5 : 2.1)



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Springbok East



Appendix B

Counting Station 206



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Kakamas West

TRAFFIC HIGHLIGHTS OF SITE 206				
1.1	Site Identifier		206	
1.2	Site Name		Kakamas West	
1.3	Site Description		Between Pofadder and Kakamas	
1.4	Road Description	Route : N014 Road : TR026 Section : 02 Distance : 119.5km		
1.5	GPS Position		20.508223E -28.771084S	
1.6	Number of Lanes		2	
1.7	Station Type		Secondary	
1.8	Requested Period		2009/01/01 - 2009/12/31	
1.9	Length of record requested (hours)		8760	
1.10	Actual First & Last Dates		2009/08/20 - 2009/09/09	
1.11	Actual available data (hours)		477	
1.12	Percentage data available for requested period		5.4	
		To Kakamas	To Pofadder	
			Total	
2.1	Total number of vehicles	5114	5573	10687
2.2	Average daily traffic (ADT)	257	281	538
2.3	Average daily truck traffic (ADTT)	36	39	75
2.4	Percentage of trucks	14.0	13.9	13.9
2.5	Truck split % (short:medium:long)	35 : 30 : 35	40 : 32 : 28	38 : 31 : 31
2.6	Percentage of night traffic (20:00 - 06:00)	10.9	10.6	10.8
3.1	Speed limit (km/hr)			120
3.2	Average speed (km/hr)	119.0	112.1	115.4
3.3	Average speed - light vehicles (km/hr)	123.1	116.2	119.5
3.4	Average speed - heavy vehicles (km/hr)	94.0	86.8	90.3
3.5	Average night speed (km/hr)	111.2	106.8	108.9
3.6	15th centile speed (km/hr)	95.8	91.7	93.7
3.7	85th centile speed (km/hr)	142.0	134.0	137.9
3.8	Percentage vehicles in excess of speed limit	48.4	34.1	41.0
4.1	Percentage vehicles in flows over 600 vehicles/hr	0.0	0.0	0.0
4.2	Highest volume on the road (vehicles/hr)		2009/08/26 17:00:00	76
4.3	Highest volume in the North (vehs/hr)		2009/08/26 17:00:00	53
4.4	Highest volume in the South (vehs/hr)		2009/08/26 09:00:00	49
4.5	Highest volume in a lane (vehicles/hr)		2009/08/26 17:00:00	53
4.6	15th highest volume on the road (vehicles/hr)		2009/08/28 14:00:00	55
4.7	15th highest volume in the North direction (vehs/hr)		2009/09/04 14:00:00	28
4.8	15th highest volume in the South direction (vehs/hr)		2009/08/31 09:00:00	33
4.9	30th highest volume on the road (vehicles/hr)		2009/09/07 12:00:00	49
4.10	30th highest volume in the North direction (vehs/hr)		2009/09/08 13:00:00	26
4.11	30th highest volume in the South direction (vehs/hr)		2009/08/25 10:00:00	30
5.1	Percentage of vehicles less than 2s behind vehicle ahead	2.3	3.0	2.7
6.1	Total number of heavy vehicles	716	772	1488
6.2	Estimated average number of axles per truck	4.6	4.4	4.5
6.3	Estimated truck mass (Ton/truck)	27.0	25.8	26.4
6.4	Estimated average E80/truck	1.7	1.6	1.7
6.5	Estimated daily E80 on the road			124
6.6	Estimated daily E80 in the North direction			61
6.7	Estimated daily E80 in the South direction			64
6.8	Estimated daily E80 in the worst North lane			61
6.9	Estimated daily E80 in the worst South lane			64
6.10	ASSUMPTION on Axles/Truck (Short:Medium:Long)			(2.0 : 5.0 : 7.0)
6.11	ASSUMPTION on Mass/Truck (Short:Medium:Long)			(10.9 : 31.5 : 39.8)
6.12	ASSUMPTION on E80s/Truck (Short:Medium:Long)			(0.6 : 2.5 : 2.1)



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Kakamas West

