Traffic Assessment Report for the proposed Mutsho Power Project near Makhado, Limpopo

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SUMMARY SHEET

Report Type:	Traffic Assessment Report
Title:	Traffic Assessment Report for the proposed Mutsho Power Project near Makhado in Limpopo
Location:	Farm Vrienden No. 589 and Farm Du Toit No. 563 near Makhado in the Limpopo Province located at the intersection of D744 and D1021
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This Traffic Screening Report has been prepared in accordance with the requirements in the TMH 16 Vol 1 & 2 South African Traffic Impact and Site Traffic Assessment Manual, August 2012, compiled by the Committee of Transport Officials (COTO) by a suitably qualified and registered professional traffic engineering technologist. Details of any of the calculations on which the results in this report are based will be made available on request.

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1. PROJECT DESCRIPTION

Savannah Environmental (Pty) Ltd has been requested to prepare an Environmental Impact Assessment (EIA) for a new coal-fired power station proposed on the Farm Vrienden No. 589 and the neighbouring Farm Du Toit No. 563 near Makhado (Louis Trichardt) in the Limpopo Province.

The proposed project will have a generation capacity of up to 600MW and will require a minimum development footprint approximately 350ha in extent.

Once developed, the project is intended to form part of the Department of Energy's (DoE's) Coal Baseload Independent Power Producer (IPP) Procurement Programme (CBIPPPP)

The project would typically comprise of the following key components and associated infrastructure:

- Power island consisting of:
    - Circulating Fluidised Bed (CFB) boiler technology.
    - Electrostatic Precipitator (ESP) systems and Flue / smoke stacks.
    - Direct dry (air-cooling) systems.
    - Balance of plant components (incl. steam turbine and generator etc.).
- Coal and Limestone / Lime Rail Spur and / or Road Off-loading Systems.
- Upgrading or establishment of a rail siding.
- Coal crusher and raw material handling equipment.
- Strategic and Working Coal stockpiles.
- Limestone storage and handling area.
- Ash dump (dry-ashing) is proposed in order to reduce the project's water requirements, which is in alignment with the recommendations of the National Development Plan (NDP) and
- Integrated Energy Plan (IEP)).
- Water infrastructure. This includes:
    - Raw water storage dams.
    - Water supply pipelines and booster stations.
    - Pollution control dam/s.
    - Water treatment plant (WTP).
    - Wastewater treatment plant (WWTP).
    - Storm water management systems.
- HV Yard and substation components with HV overhead transmission lines connecting to the
- Eskom infrastructure.
- Control room, office / administration, workshop, storage and logistics buildings.
- Upgrading of external roads and establishment of internal access roads.
- Security fencing and lighting.

The construction phase is planned to take approximately 4 – 5 years to complete, and the Mutsho Power Project will have an operational period of 30 years.

2. SPECIALIST CREDENTIALS

This Traffic Impact Assessment Report is prepared by Mr. Stephen Mark Fautley is a Professional Traffic Engineering Technologist registered with the Engineering Council of South Africa [ECSA Registration Number 200270171] and is a member of the South African Institute of Civil Engineers [Member Number 201500599].

He has over 30 years of experience in geometric design, traffic engineering, intelligent transport systems, and road safety, and as a traffic specialist providing input to environmental impact assessments.

A copy of Mr. SM Fautley Curriculum-Vitae is attached for further information (see Annexure D).

3. DETAILS OF SPECIALIST AND DECLARATION

A declaration that the specialist is independent is attached to this report (see Annexure E).

4. PURPOSE AND SCOPE OF THE REPORT

This report contains a description of the status quo transport environment and infrastructure, and the transport/traffic impact for the construction and operation of the proposed power station. It considers the proposed Plant traffic impact, with reference to road transport routing and site access for the Mutsho Power Project and also assesses the Plant traffic related impacts on the environment. Where issues are identified the report makes recommendations to mitigate those impacts.

The project scope for this report covers three alternative coal power station layouts. The report deals with traffic impact for each of the alternatives.

5. METHODOLOGY

The methodology followed in this report is as follows:

- The extent of the project was considered to ascertain the anticipated traffic during construction and operations;
- A site visit was undertaken on 26 & 27 August 2017 at the identified site to view road transport access routes and access implications for the project, in relation to the background traffic and anticipated Plant traffic. The period of the site visit is normal to road traffic and is relevant to this report consideration of the development traffic impact;
- Road conditions and road environment serving the project was assessed and documented;
- Traffic counts were undertaken at identified intersections during the above site visits, for the AM and PM peak hours, and at the N1/D1021 intersection during the AM peak hour. The period of the

site visit is normal to road traffic and is relevant to this reports consideration of the development traffic impact;

- Peak hour Plant trip generation, for the Construction Phase and the Operations Phase was determined based on the scale of the Plant and with reference to staffing requirements for a similar sized Plant;
- Assumptions were made for modal split, and vehicle numbers were determined based on anticipated staffing levels (Management/Specialist Staff and Construction Staff numbers), vehicle types and vehicle capacity;
- Development trips were distributed in proportion to the likely staff origins to the north and south of the site, and were assigned to the road network accordingly;
- Intersection capacity analysis was carried out for the Construction Phase (Year 2025) and Operations Phase (Year 2035 and 2045) with background traffic growth at 4% pa;
- A Traffic Impact Assessment was carried out, for the projects Construction and Operations Phases, to highlight the Plant transport related environmental impacts;
- The Decommissioning Phase (anticipated in Year 2055) was analysed with 4% compound traffic growth to background traffic. In view of the timescale and multitude of variables that could influence traffic growth, this exercise is indicative at best. Decommissioning is expected to take approximately 12 months and the number of trips is expected to be less than 50% of the Construction phase annual trips.

6. PLANT LOCATION

The two properties which comprise the project area, Farm Du Toit No. 563 and Farm Vrienden No. 589, are located in the Limpopo Province, at the intersection of D744 and D1021 roads.

The sites are approximately midway between the towns of Makhado (Louis Trichardt) and Musina and are some 12 km west of the N1 (see **Figure 6-1** and **Figure 6-2** below).

Figure 6-1: Locality Map 1

Figure 6-2: Locality Map 2

7. STATUS QUO

The following section summarises the present conditions impacting on traffic and transportation for the proposed Mutsho Power Project.

7.1. Provincial Roads and Traffic Volumes in the Surrounding Area

Peak hour classified traffic counts were undertaken in July 2017 at the following intersections:

- N1 / D1021 (AM)
- D744 Road / D1021 Road (AM and PM)
- D777 Road & D744 Road (AM and PM)

D744 and D1021 are secondary roads that carry very low traffic volumes (<10 vehicles per hour). D777 also carries low traffic volumes (less than 50 vph).

The major road in the vicinity of the study area is the N1, between Makhado (Louis Trichardt) and Musina. This section of the N1 carries low traffic volumes but has a high percentage of heavy vehicles (Over 25% heavy vehicles counted but is generally around 17% based on annual traffic count data). The heavy vehicles comprise mainly freight trucks and buses.

The AM traffic volume on the N1 is low, as shown in **Table 7.1** below.

Table 7.1: AM Traffic counts on N1 at N1/D1021 junction

1 Hr Vehicle Count on N1 at N1/D1021 Junction (27 June 2017)									
Time	SB - To Louis Trichardt				NB - To Mussina				Sum
	P Veh	HV	Taxi	Bus	P	HV	Taxi	Bus	
7:15 - 7:30	18	10	1		21	5	2	0	57
7:30 - 7:45	14	2	1		13	1	2	1	34
7:45 - 8:00	9	2	1		23	4		2	41
8:00 - 8:15	10	7		3	22	10			52
Vph	51	21	3	3	79	20	4	3	184
	78				106				
Directional Split (%)	42%				58%				100%
EVU ph	51	63	3	9	79	60	4	9	278
SUM	126				152				
Directional Split (%)	45%				55%				100%

In view of the low background traffic flow at the above intersection, and observations of traffic flow during the PM, the intersection was not counted for the PM.

7.2. Description of Road Infrastructure

The roads in the immediate vicinity of the site are shown in **Figure 6-1** and **Figure 6-2** and Appendix B – Pictures, and are discussed below:

N1: Paved National Route (N1 Section 29) with north south orientation located some 12km east of the project site. It has one lane in each direction carrying low volumes of traffic during the critical peak hours but a high proportion of heavy vehicles throughout the day. The road is in a fair condition but lacks shoulders. Pavement deformation is evident in some areas and the road is due for upgrading. It is anticipated that this section of the N1 will be upgraded within the next 5 years.

D777: Paved District road with east-west orientation. One lane in each direction and carries low volumes of traffic during peak hours. The road condition is good.

D744: Gravel District road with north-south orientation. One lane in each direction and carries very low volumes of traffic during peak hours. The road condition is poor.

D1021: Gravel District road with east-west orientation. One lane in each direction and carries very low volumes of traffic during peak hours. The road bisects Farm Vrienden No. 589. The road condition is poor.

7.3. Location of Staff Residences

The major source of construction workers and employees for the proposed power station are anticipated to be from Makhado and nearby townships to the south (near Louis Trichardt) and Musina to the north.

7.4. Other Transport Infrastructure

A railway line runs parallel to and east of D744. This could be used to transport and deliver sorbent, and other equipment and a new rail siding will be required. A gravel road will be required to provide access to the new rail siding. The rail line links Pretoria to Zimbabwe at Beit Bridge, via Musina.

Coal will be transported to site either via a new 22km railway loop proposed for development between the Makhado Colliery and existing Huntleigh railway siding, or via road transport. The proposed new railway loop forms part of the Makhado Colliery development and is therefore excluded from the current scope of work. In the event that coal is transported via the proposed new railway loop a railway spur would need to be developed on-site for the offloading of coal and other raw materials (i.e. limestone). The use of rail for transport of coal to the Mutsho Power Plant would reduce road traffic impact.

8. ALTERNATIVE DESIGN PROPOSALS

Three design alternatives are considered for the Power Plant, and each incorporates a new access road servitude and a new rail siding. The main access to the Plant will be via D1022. The proposed new railway loop that forms part of the Makhado Colliery development could be used to transport and deliver sorbent and other raw materials to the Plant.

8.1. Preferred Layout Alternative

The power plant and raw water storage dam are both proposed south of the proposed railway line, while the ash dump and ash dump runoff dam are proposed north of the proposed railway line. Based on the desk-top analysis of this proposed layout, this alternative is considered to be most favourable from an environmental perspective as it is perceived to pose the least environmental impacts or risks. The location of the ash dump and ash dump run-off dam away from prominent drainage lines reduces the potential risk of contamination. This is the preferred Alternative as shown in **Figure 8-1** below.

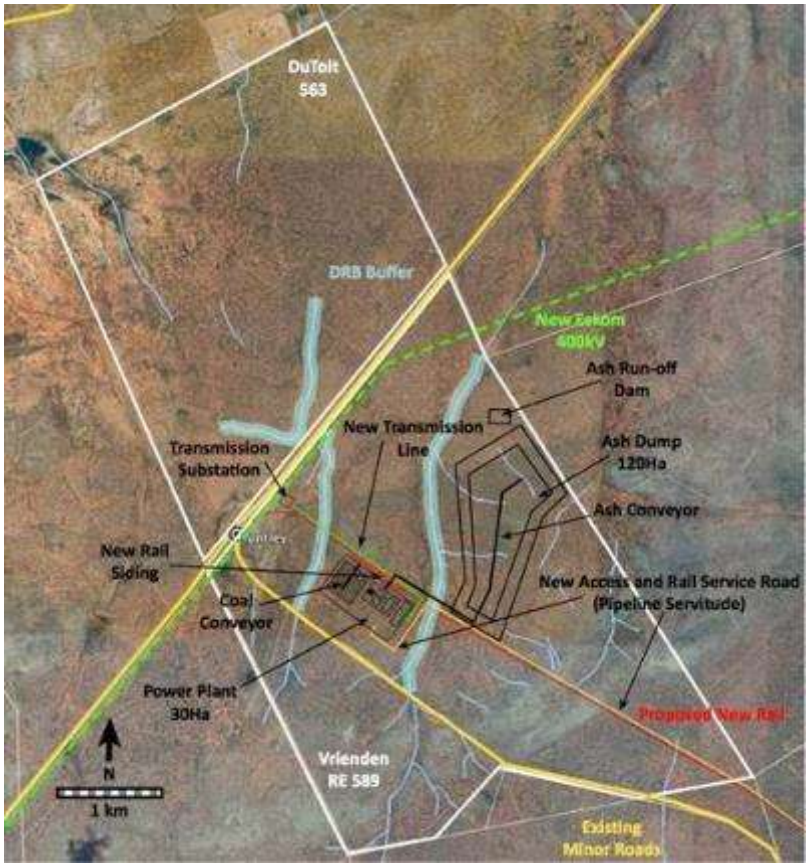

Figure 8-1: Preferred Layout Alternative

8.2. Layout Alternative A

Layout Alternative A entails the development of the majority of project related infrastructure on the Farm Vrienden 589, with the remaining infrastructure proposed on the eastern extent of the Farm Du Toit 563 (see **Figure 8-2** below).

This layout alternative is considered less favourable from a technical perspective than the preferred layout alternative, as the project would be required to straddle existing infrastructure, such as the railway line which occurs between Farm Du Toit 563 and Farm Vrienden 589.

Given the location of the ash dumps, the ash conveyor required to transport ash generated by the power plant to the ash dump would be routed underneath Eskom's proposed 400kV power line. In addition, this layout A entails the development of the two ash dumps and an ash dump run-off dam between and within close proximity to prominent drainage lines, which is less favourable from an environmental perspective as it increases the potential risk for contamination.

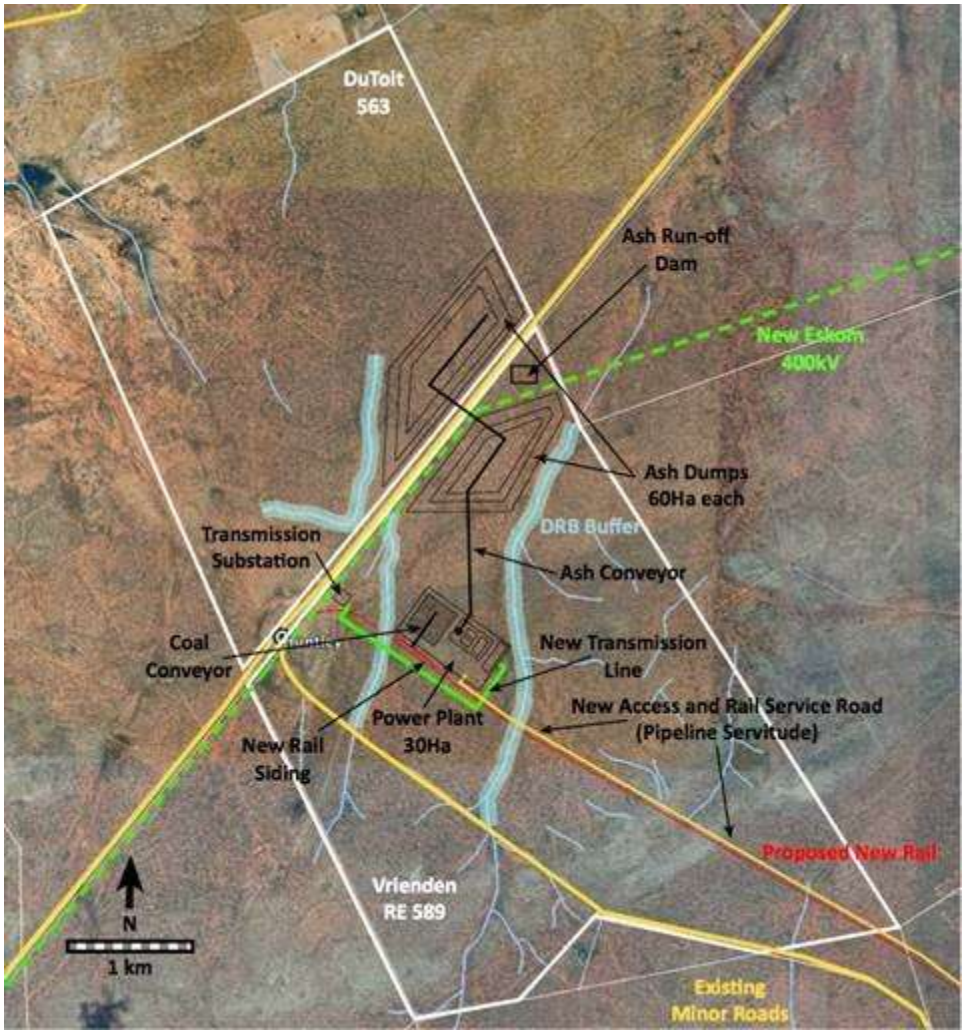

Figure 8-2: Layout Alternative A

8.3. Layout Alternative B

Layout Alternative B entails the development of all infrastructure on the Farm Vrienden 589 (see **Figure 8-3** below). The power plant is proposed for development south of the proposed railway line, while a single ash dump and ash dump run-off dam is proposed for development north of the proposed railway line, between two prominent drainage lines. This layout alternative has a possible concern from an environmental perspective given the proximity of the ash dump and ash dump run-off dam to the drainage lines, and the potential risk for contamination Although similar to Alternative 1 it will be more visible from D744. This is the least favoured alternative.

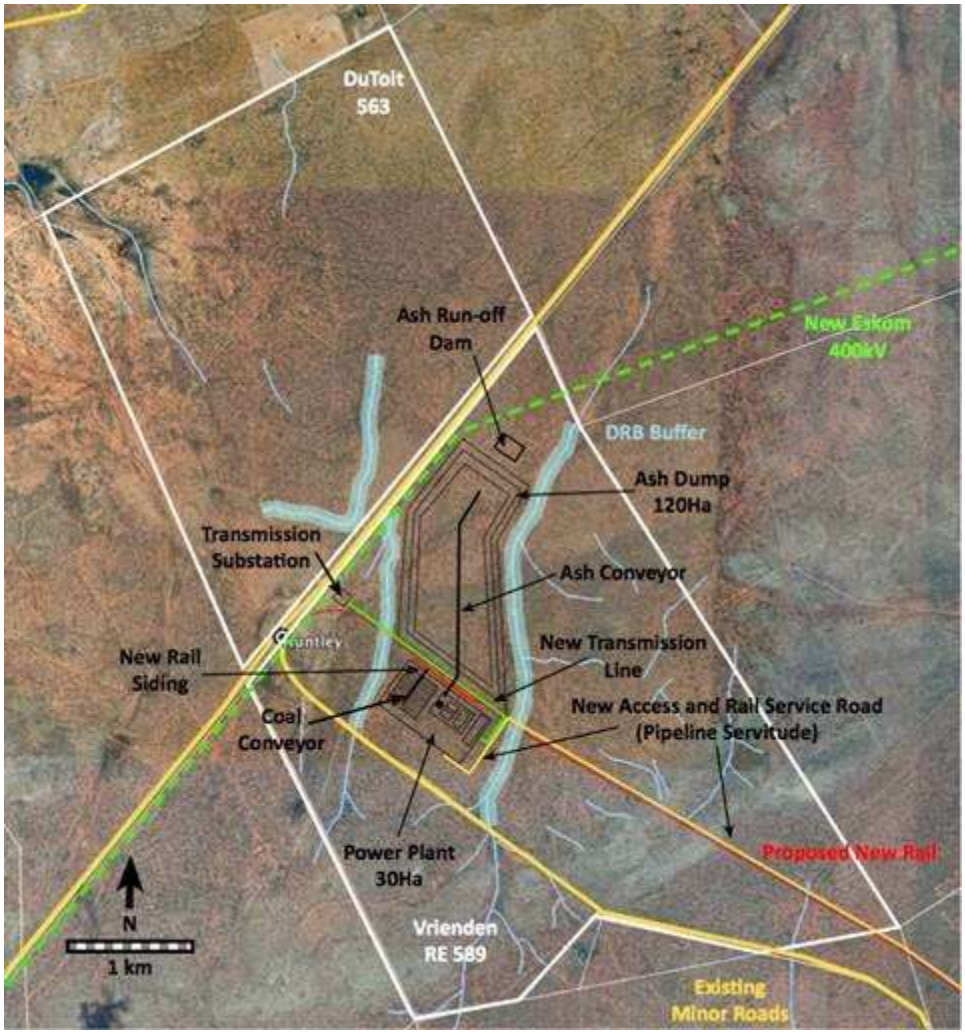

Figure 8-3: Layout Alternative B

The properties are in close proximity to one another, with the same access routes leading to the main road network. Consequently, the sites are identical from a traffic and transport perspective and the following applies equally to all three design alternatives. The only difference is that an access from D744 to Farm Du Toit 563 would be required for Layout Alternate A. This access is insignificant and would be used very infrequently to attend to the coal ash dump. Coal ash will be dumped by conveyor belt system and the conveyor will be directed to new sectors as needed. The coal ash would remain on-site and would be rehabilitated in time.

9. SITE ACCESS

9.1. Site Access

Access to the two sites are as discussed below:

Farm Du Toit No. 563

Access to the subject property is from D744.

The site abuts D744 and is virtually opposite the D744/D1021 intersection (see **Figure 6-2**).

In view of the close proximity of the railway line to D744 (see **Photograph 9-1** below) access to this site should be located on D744 and to the north of D744/D1021 junction, to accommodate vehicle stacking, etc. (See Appendix B for further photos).

Photograph 9-1: D1021 viewed from D744. Note railway level crossing.

Farm Vrienden No. 589

Access to the subject property can be from D1021.

The site access would need to be positioned sufficiently far from the D744/D1021 junction and the railway level crossing for road safety and also requires careful placement in view of road geometry, in order to achieve adequate shoulder sight distance around bends.

10. SITE ACCESS ROUTING

10.1. Site Accessibility/Routing

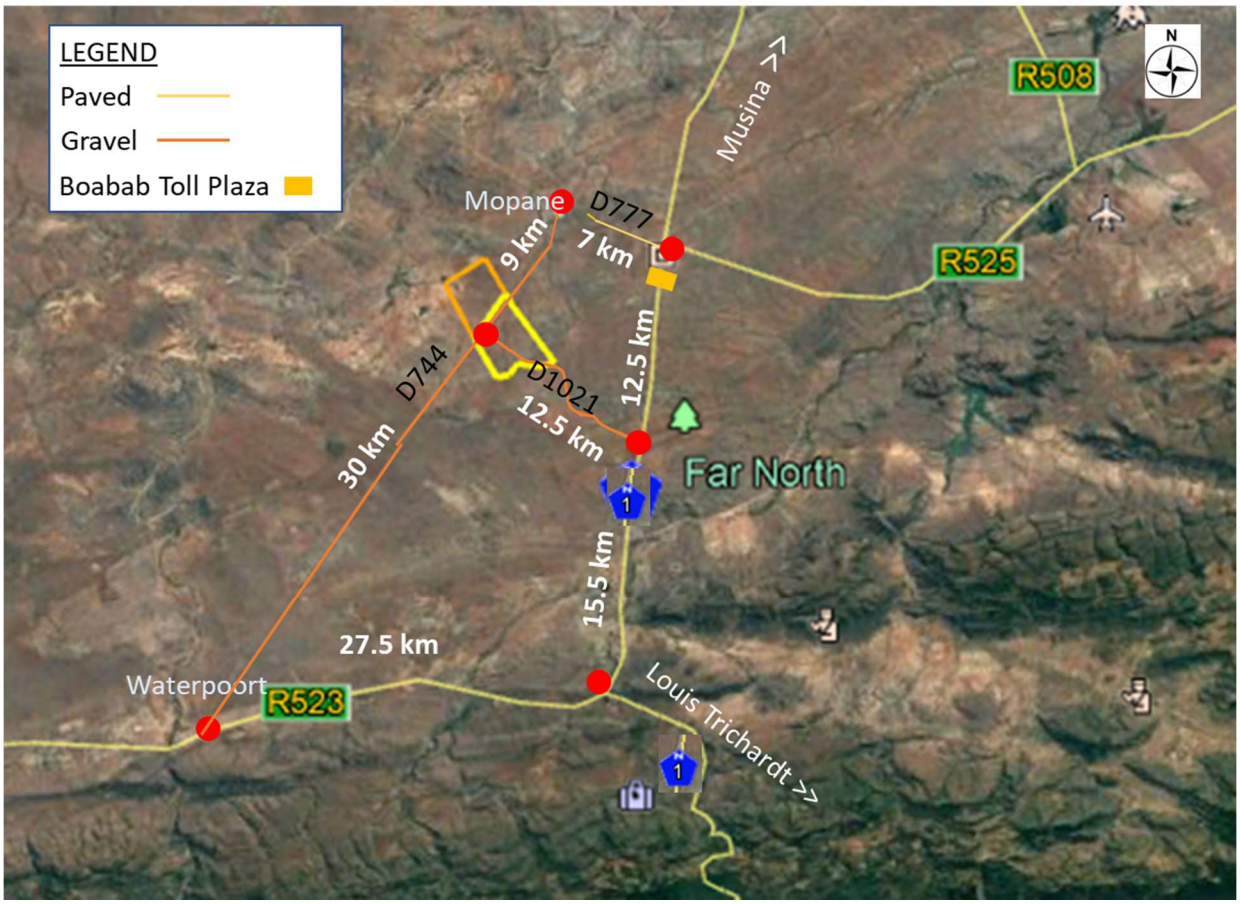

Figure 10-1 below shows approximate travel distance along various road segments leading to the two identified sites.

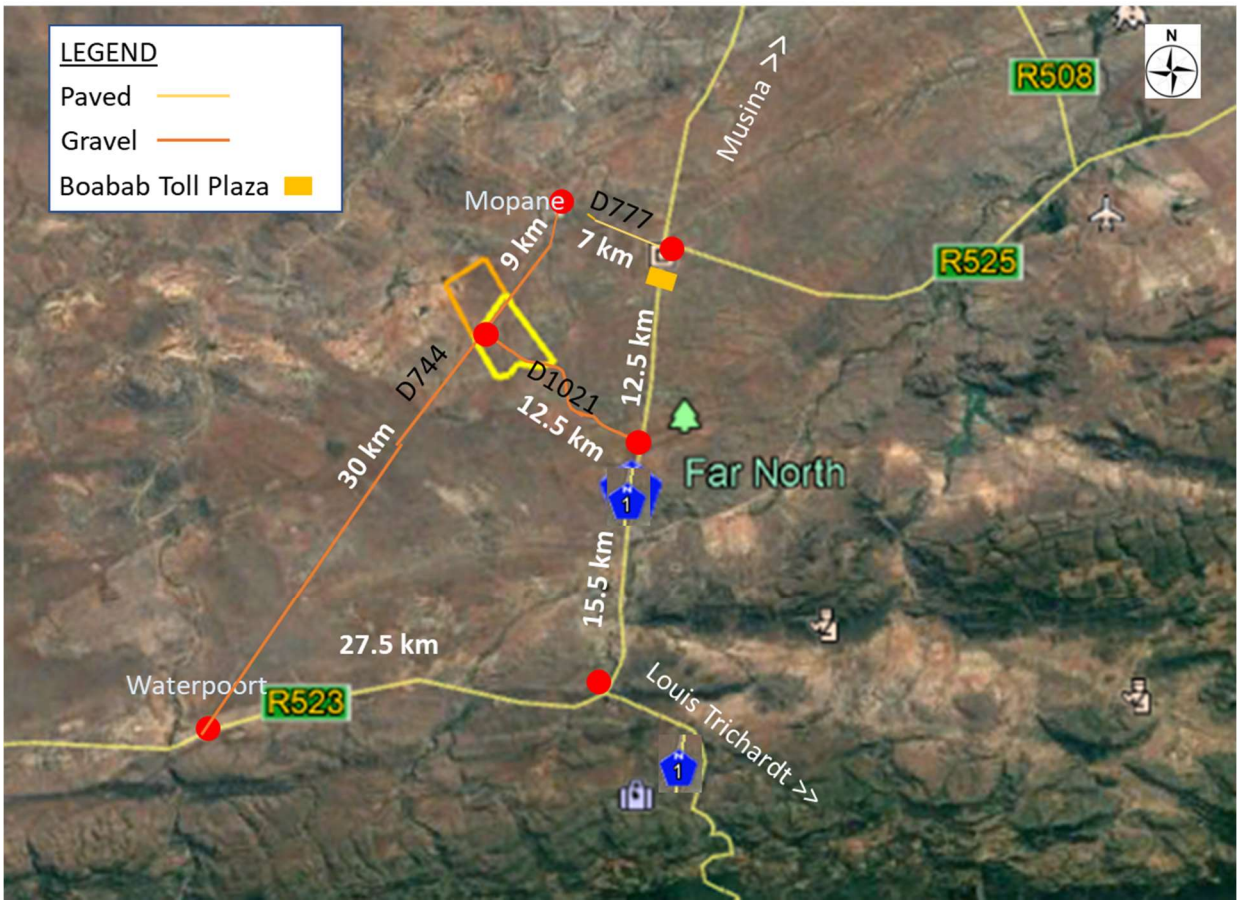

Figure 10-1: Routes to Proposed Mutsho Power Plant

10.1.1. To and from the north (Musina)

The preferred route is along the paved N1 and paved D777 and along gravel road D744.

This route has 3.5 km less gravel road and 5.5 km less paved road (total distance some 9 km shorter) as opposed to travelling via the N1 and D1021 from the north. This route also avoids the Baobab Toll Plaza on the N1 (see

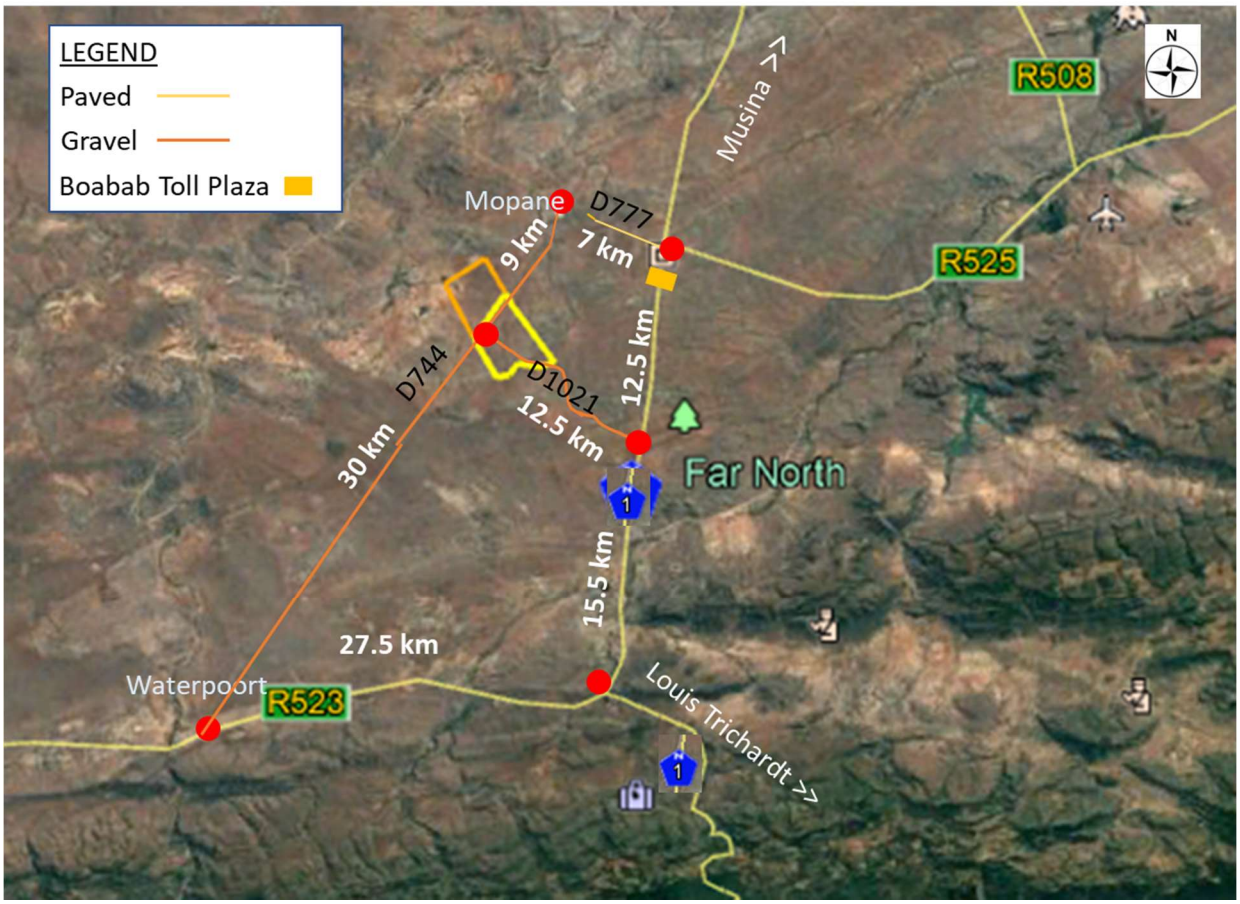

Figure 10-1 above).

The N1 is a high speed, high capacity two-lane road, and has sufficient spare capacity to accommodate the Plant traffic. The speed limit ranges between 100 km/h and 120 km/h per hour over various portions of the route.

The D777 is an underutilised paved roadway with sufficient spare capacity to accommodate the Plant traffic. It traverses a railway level crossing and passes through Mopane (a small town with few inhabitants). Mopane is characterised by lack of sidewalks, with people and some cattle walking in the streets. The boarding school located in Mopane caters for the scholars needs, including shopping, entertainment, etc., and children are not allowed to leave the premises to go to town.

D744 is a quiet two-lane gravel road and is shared by vehicles and a few pedestrians.

10.1.2. To and from the south (Makhado)

The preferred / shortest route to and from the south is along the paved N1 and gravel road D1021 (12.5 km).

D1021 is a quiet two-lane gravel road shared by vehicles and a few pedestrians. Animals were observed being herded across the road on occasion.

10.2. Routes identified to serve the Plant

Considering the above, and the intention to source construction workers and staff from townships to the south (Makhado and others nearby) as well as Musina to the north, both of the above-mentioned routes should be used to serve the Plant, regardless of which site is selected, particularly during the construction period. Consequently, both of these routes are assessed.

11. ASSUMPTIONS FOR TRAFFIC IMPACT ASSESSMENT

11.1. Workforce and Vehicle Trips

The number of employees and vehicles generated/attracted to the proposed 600 MW Mutsho Power Project is based on the staffing requirements for similar sized Plant. It is understood that the ash disposal site will be located in close proximity to the proposed Mutsho Power Project, within the same project site.

11.2. Coal Transport

Coal required for the project will be sourced from the Makhado Colliery to be developed approximately 20km south-west of the project site. Coal will be transported to site either via a new 22km railway loop proposed for development between the Makhado Colliery and existing Huntleigh railway siding, or via road transport.

This report assumes road-based transport (i.e. the worst-case vehicle numbers and traffic impact).

Ground level conveyors will transport coal from the coal stockpile to the power plant. These conveyors will pass over or under any road, rail or powerline infrastructure when crossing it.

Service roads will be constructed on-site alongside the coal and ash conveyors for maintenance of the conveyors. This will also serve as emergency routes to deliver coal and transport ash in the event of a conveyor failure when demand exceeds the stockpiled supply.

11.3. Sorbent Transport

Limestone will be transported to site either via rail or road transport. This report assumes road transport.

In the event of rail transport being used, Limestone sorbent will be delivered to site by rail using the existing railway line running on Farm Vrienden No. 589. The sorbent will then be loaded onto the overland conveyors to be delivered to the power plant. Truck deliveries will be used in case of emergency situations on the odd occasion should the overland conveyors breakdown.

11.4. Ash Handling

The transport of ash from the power station to the ash dump will be via ground level conveyor systems. The dry ash will be conditioned by the addition of water at the power station to ensure dust generation is minimised.

11.5. Access Design

Access to the power station and the ash stack area will be from D744 and / or D1021 (to be decided during further design planning). The access intersection configuration will need to be designed accordingly.

Alternate access for construction access and delivery of equipment will also be determined and designed accordingly.

It is assumed that on any normal day all coal and sorbent will be transported by trucks (as assumed for this assessment) or alternatively via a new rail line. Sorbent and ash will be moved within the project site via the conveyor system.

12. TRAFFIC IMPACT ASSESSMENT

12.1. Traffic Impact

The Construction Phase Traffic and Operation Phase Traffic impact is determined based on the Plant build and operations staffing and transport needs. Trip generation and modal split are determined and Plant trips distributed and assigned to the road network with reference to the staff origins/places of residence. Critical road elements/intersections are identified for capacity analysis.

12.2. Construction Phase Traffic

This traffic relates directly to the traffic expected during the construction of the Mutsho Power Project and the ash dump facility which is expected to take place over a period of 4 to 5 years including testing and commissioning of the units. It is expected that Plant will begin operations around Year 2025, 4 to 5 years from the start of site preparation. With construction completed the Plant trips will be substantially reduced.

It is estimated that a peak number of construction staff will peak at 2500 persons per month. The worst-case scenario would be when the same number of staff arrives on site each day. As a conservative approach, it was therefore assumed that all 2500 workers will be on site each day. The majority of the workforce is expected to be local from Makhado and nearby towns and a small portion from Musina.

10% of the construction personnel are expected to use private cars while the remainder is expected to make use of a bus shuttle service provided for by the contractor.

A total of 250 people is expected to use private vehicles and the remaining 2250 will use buses from local residential areas.

Assuming a vehicle occupancy of 1.2 staff per vehicle, 208 light vehicle trips are expected to be generated by mostly management, specialists, engineers, etc.

It is expected that 20 seater, 40 seater, and 60 seater buses will be used to shuttle the construction staff from various township in close proximity to the site. For staff transport to site, 20% are assumed to use 20 seater buses; 30% to use 40 seaters and the remaining 40% to use 60 seater buses. These trips are expected to arrive in the morning and leave in the afternoon. The contractor is expected to provide a secure holding area for the buses.

The peak construction period is expected to generate about 40 trucks per day with 50% expected to arrive during the morning (AM) peak hour and depart during afternoon (PM) peak hour.

The total peak hour trips expected to be generated by the construction phase is shown in **Table 12.1** below. For the AM peak hour an 80/20% in/out split for all vehicles is assumed (and vice-versa in the PM).

The impact of heavy vehicle traffic in terms of road capacity is expected to be minimal.

Table 12.1: Construction Traffic

Vehicle Trips (AM and PM Peak Hr)						
Description	**% or #**	**Peak Hr Trips**				
Vehicle Classification		Light Veh	Heavy Vehicles			
Vehicle Type		Passenger	Buses			Trucks
Vehicle Occupancy		1.2	20	40	60	
% by Mode	100%	10%	20%	30%	40%	
# Staff	2500	250	500	750	1000	
# Vehicles	269	208	25	19	17	20
SUM		**208**	**80**			
To and From South	85%	177	68			
To and From North	15%	31	12			

It is difficult to determine the heavy vehicle traffic to the site, in the absence of a project program and transport logistics. The sources of construction materials, supply of material components and the construction programme all influence the nature and frequency of road-based vehicle transport to and from the site. The main source of construction material is assumed to be from Gauteng. The raw materials for the plant will be transported either by rail or by road transport.

12.3. Transport of Abnormal Load Components during Construction

The estimated dimensions and gross weights of heavy and oversize equipment and components to be delivered to the Plant site are a function of the project build planning, which details are not yet disclosed. These items typically comprise Cranes, Deaerators and Deaerator Tanks, Transformers, Generators, Turbines, Boiler Drums, etc. Abnormal load transport permits are required for the transport of abnormal loads.

Abnormal loads would need to be transported to the site from Durban harbour or possibly Richards Bay.

The most likely route from Durban harbour follows National Route N3 and turns off at the N11, travelling through Ladysmith and Newcastle and then turning onto the N1 near Mokopane. On the N1 it travels north through Polokwane and through Louis Trichardt, eventually turning off at the D1021 to access the proposed power station site some 12.5 km to the west.

Although the tonnage is expected to be significant the low frequency of the trips means that the traffic loading impact is negligible.

Turning radii of 15m are required for the large super-link loads and the access gate should be set back sufficiently to accommodate vehicles standing off the public road.

12.4. Operational Phase Traffic

The facility will operate 24 hours a day.

An estimated total number of Operation and Maintenance staff is 200 working on four shifts rotations. It is assumed that 50 staff at the end of a shift will not leave the site until the next 50 shift workers have assumed duty. It is assumed that most of the operations staff will be transported via a taxi shuttle service.

A 10% / 90% modal split between private cars and shuttle taxis respectively was assumed.

It is expected that a taxi shuttle service will be provided for the Operations Phase. The modal split will see approximately 8 light vehicles and 4 taxis during the operations phase. The staff relate generation during this phase is insignificant.

Assuming that 11 000 Tons of coal and 263 Tons of limestone, are transported by road each day it would equate to some 74 x 32 Ton peak hour trips (split 50% in/50% out) for 10 hours per day.

Including staff peak hour trips, the Operations Phase peak period generates less traffic than during the Construction Phase. The Operations Phase traffic impact is however considered for year 2035 with a 4% compounded traffic growth per annum applied to background traffic.

This intersection performance should however be monitored on an annual basis and a traffic roundabout should be considered where priority control results in a poor Level of Service for vehicles on D1077 approach to N1. It is anticipated that this form of intersection control would be required during the operations phase around year 2050.

12.5. Decommissioning Phase Traffic

It is expected that the Plant will be decommissioned around Year 2055, after 30 years operations. It is not realistic to project traffic over such a lengthy time period for intersection analysis. If traffic continues to increase at 4% per annum, then the intersection of N1 and D1021 would require traffic roundabout control around Year 2050. Once the Mutsho Power Plant is decommissioned the traffic roundabout should not be required for the intersection.

12.6. Critical Peak Period

The critical peak hour from a road capacity point of view, occurs when the traffic generated by the Plant is at a maximum or when the highest combination of road traffic and traffic generated by the Plant occurs.

This critical peak hour is during the Construction Phase and the Operations Phase are as follows:

- Weekday AM peak hour; and
- Weekday PM peak hour.

12.7. Trip Distribution and Trip Assignment

The new trips that are expected to be generated by the proposed Plant were distributed and assigned to the adjacent road network based on the road layout and likely routing and with reference to the observed size of townships to the south and north of the site that will supply staff for the Plant build and operations.

- The following trip distribution was assumed for the Plant:
- 85% to / from the south; and
- 15% to / from the north.

12.7.1. Construction Phase Trips:

The expected Construction Phase trip assignment for the critical peak hours are shown in **Table 12.2** below.

Table 12.2: Construction Peak Hour Trip Distribution

Peak Hour Trip Distribution							
To and From South				To and From North			
Light Vehicles		Heavy Vehicles		Light Vehicles		Heavy Vehicles	
AM in / PM Out	AM Out / PM In	AM in / PM Out	AM Out / PM In	AM in / PM Out	AM Out / PM In	AM in / PM Out	AM Out / PM In
85%	15%	85%	15%	85%	15%	85%	15%
151	27	58	10	27	5	10	2
177		**68**		**31**		**12**	

Background traffic (with growth) including Plant Construction Phase peak hour trip assignment at the critical N1/D1021 intersection as shown in **Figure 12-1** and **Figure 12-2** below.

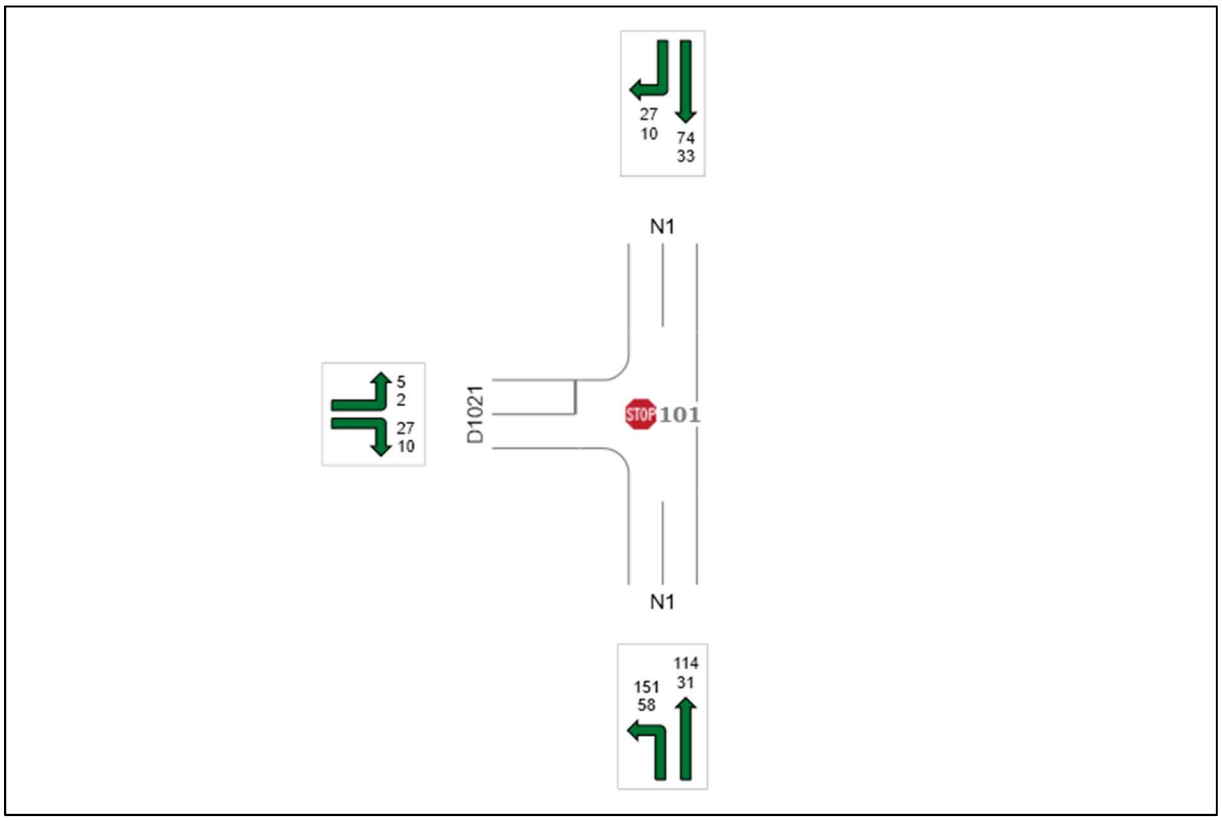

Figure 12-1: Construction Phase - N1/D1021 Intersection Traffic Flow – AM (Year 2025)

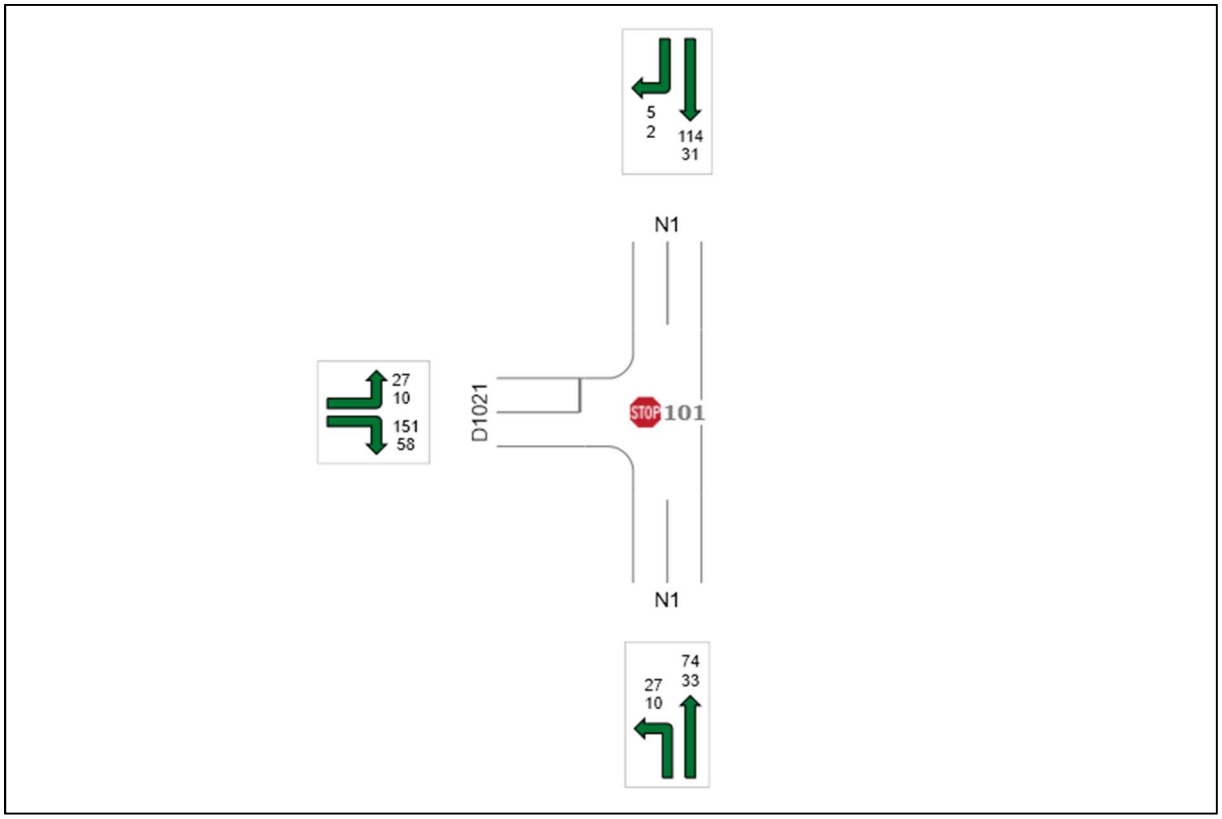

Figure 12-2: Construction Phase - N1/D1021 Intersection Traffic Flow – PM (Year 2025)

12.7.2. Operations Phase Trips:

The expected Operations Phase trip assignment for the critical peak hours are shown in **Table 12.3** below.

Table 12.3: Operations Peak Hour Trip Distribution

Peak Hour Trip Distribution							
To and From South				To and From North			
Light Vehicles		Heavy Vehicles		Light Vehicles		Heavy Vehicles	
AM in / PM Out	AM Out/PM In	AM in / PM Out	AM Out/PM In	AM in / PM Out	AM Out/PM In	AM in / PM Out	AM Out/PM In
9	9	37	37	3	3	0	0
18		**74**		**6**		**0**	

Background traffic (with growth) and Plant Operations Phase trips for the critical AM and PM peak hours are assigned to the critical N1/D1021 intersection as shown in Figure 12-3 and Figure 12-4 below for Year 2035 and in Figure 12-5 and
Figure 12-6 for Year 2045.

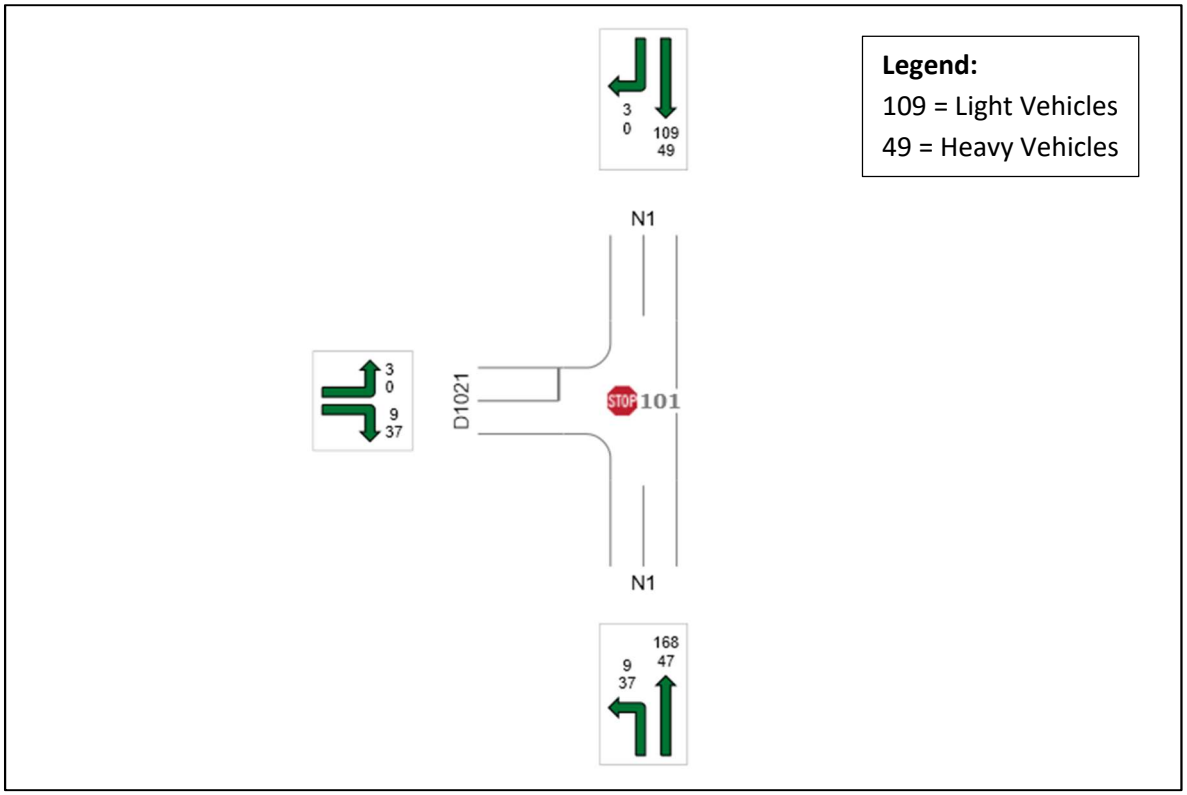

Figure 12-3: Operations Phase - N1/D1021 Intersection Traffic Flow – AM Peak Hr (Year 2035)

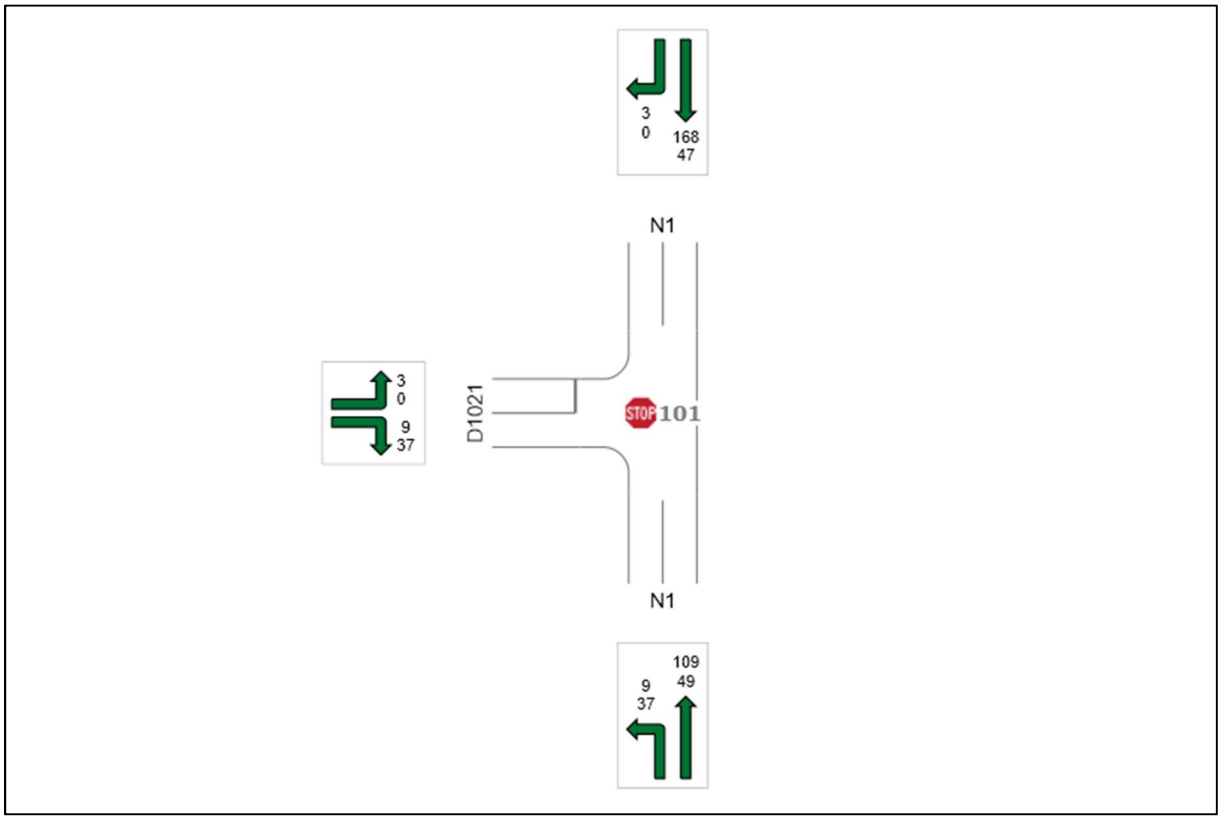

Figure 12-4: Operations Phase - N1/D1021 Intersection Traffic Flow – PM Peak Hr (Year 2035)

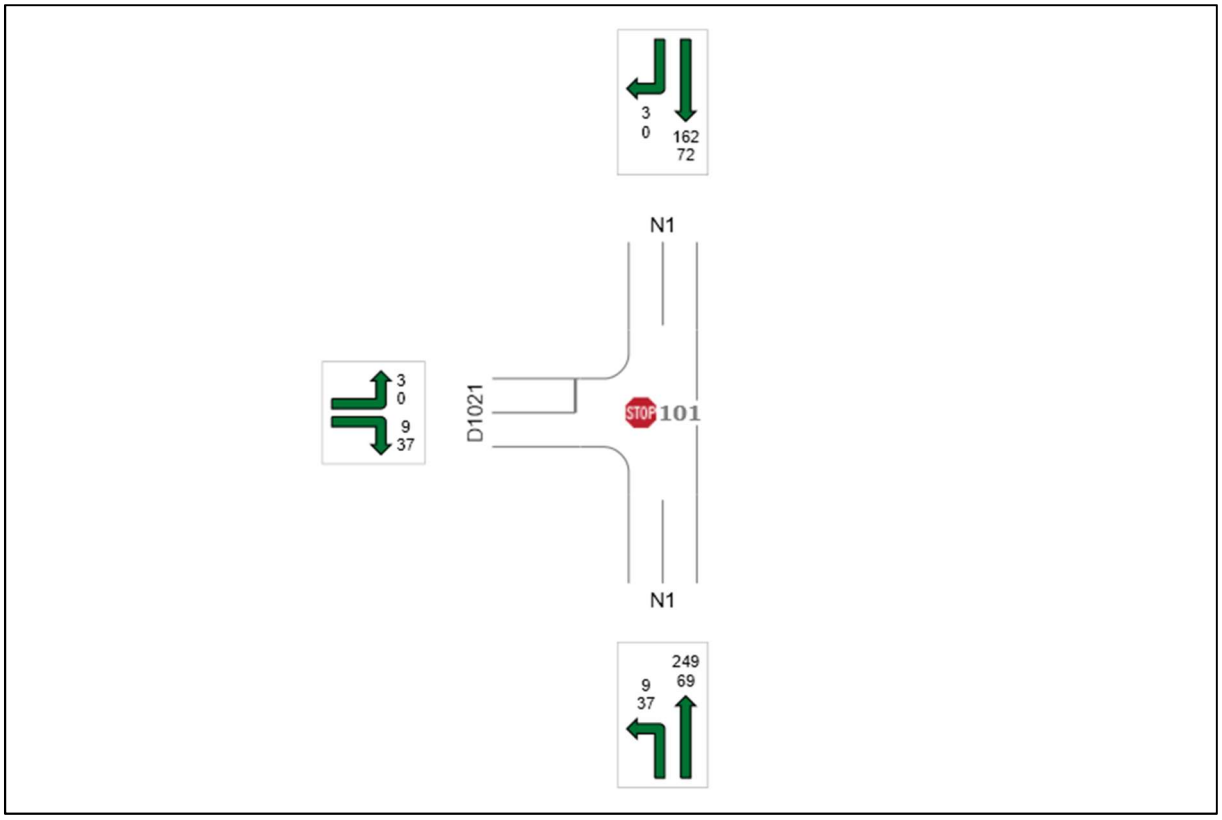

Figure 12-5: Operations Phase - N1/D1021 Intersection Traffic Flow – AM Peak Hr (Year 2045)

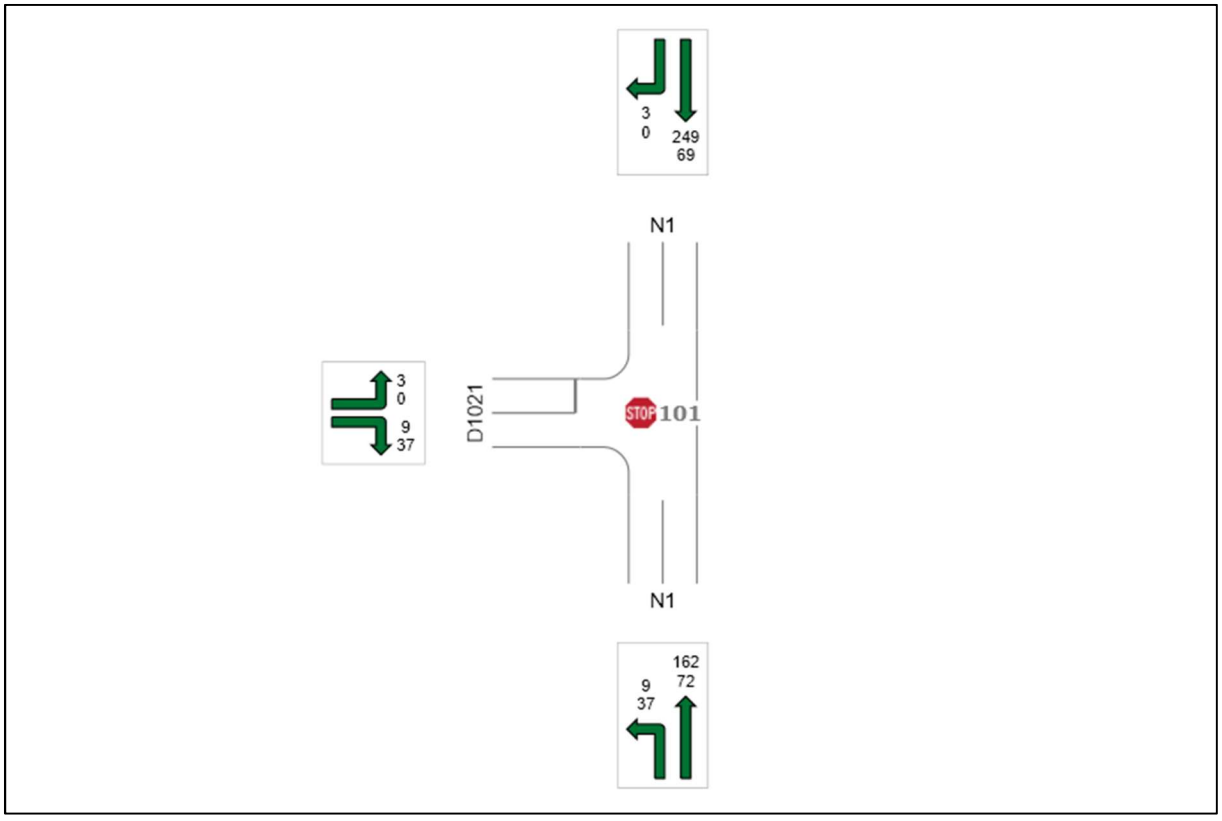

Figure 12-6: Operations Phase - N1/D1021 Intersection Traffic Flow – AM Peak Hr (Year 2045)

12.7.3. Decommissioning Phase Trips:

It is anticipated that the Decommissioning Phase trips will be less than 50% of the Construction trips. For the intersection analysis 50% is assumed. The Background traffic with growth and Decommissioning Trip assignment for the critical AM and PM peak hours are shown in **Figure** 12-7 and **Figure 12-8** below.

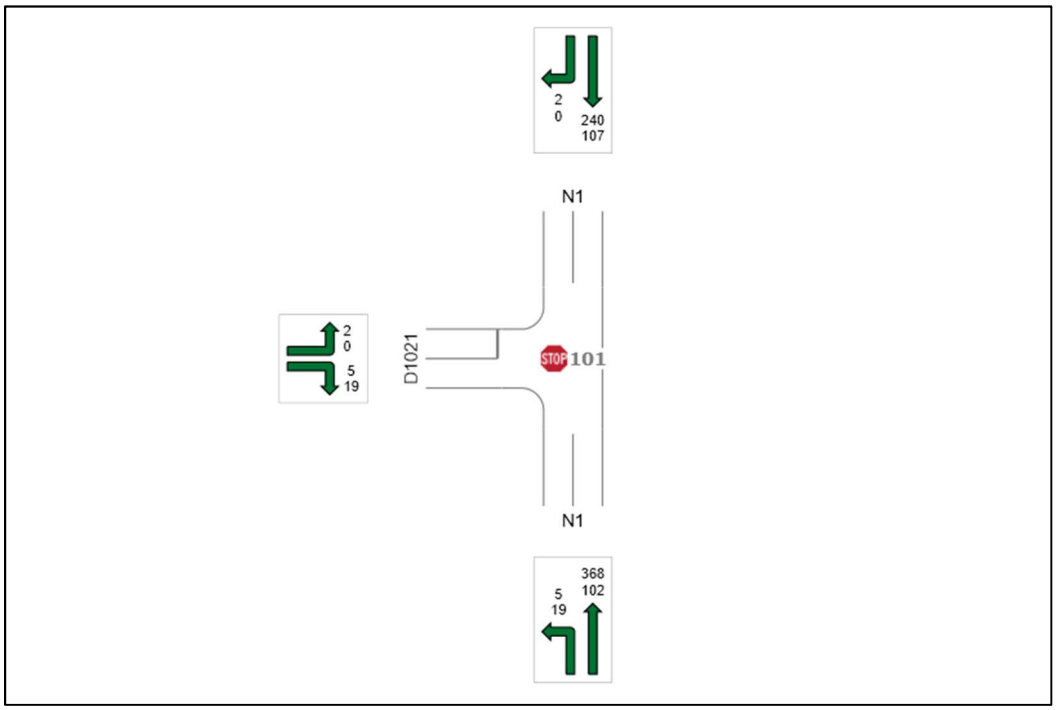

Figure 12-7: Decommissioning Phase - N1/D1021 Intersection Traffic Flow – AM Peak Hr (Year 2055)

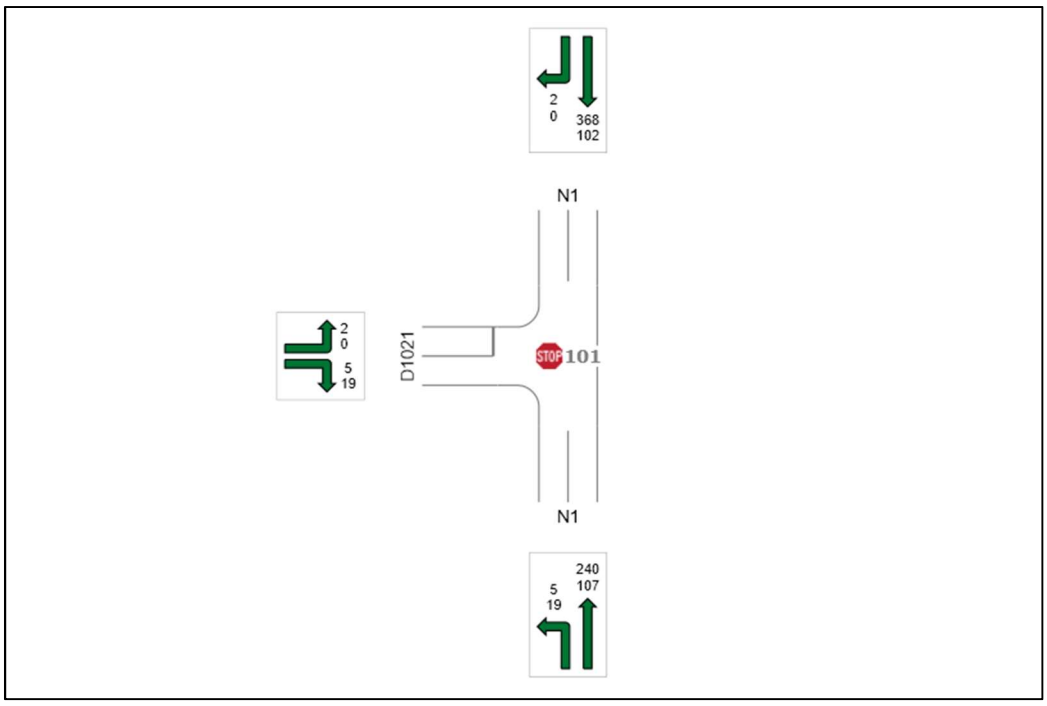

Figure 12-8: Decommissioning Phase - N1/D1021 Intersection Traffic Flow – PM Peak Hr (Year 2055)

12.8. Latent Traffic Demand and Traffic Growth

No similar Power Plants are anticipated to be constructed in the immediate area. An average growth rate of 4% per annum was assumed for the N1 for the Project Life-cycle.

12.9. Assessment Years

The assessment year(s) and different scenarios considered for the Plant are discussed below:

- **Year 2017**: Background traffic volumes are low and Level of Service (LOS) A was observed on the critical N1/D1021 intersection approaches. This scenario does not warrant Analysis.
- **Scenario 1: Horizon Year 2025:** The expected 2025 traffic conditions are based on the 2017 background traffic adjusted for growth (4% per annum for 8 years). This is the year with the highest background and Construction traffic. The background AM peak traffic flow was mirrored for the PM analysis.
- **Future years (10 years Operations):** The expected 2035 traffic conditions are based on the 2017 background traffic adjusted for growth (4% per annum). This considers Plant Operations Phase traffic. The background AM peak traffic flow was mirrored for the PM analysis
- **Future years (Nearing Intersection capacity):** The expected 2045 traffic conditions are based on the 2017 background traffic adjusted for growth (4% per annum). This considers Plant Operations Phase traffic after 20 years of operations. The background AM peak traffic flow was mirrored for the PM analysis
- **Future years (Decommissioning):** The expected 2055 traffic conditions are based on the 2017 background traffic adjusted for growth (4% per annum). The background AM peak traffic flow was mirrored for the PM analysis

12.10. Assessment Scenarios

Three scenarios were considered for analysis of the N1/D1021 intersection, as discussed below:

- **The Current Scenario** is not analysed in view of low background traffic flow and negligible traffic on the lower order/gravel roads.
- **The Construction Phase** has considerably higher trip generation than the Operations Phase. It is assumed that the Construction Phase will commence in year 2020 and will reach completion 4 to 5 years later. The year 2025 represents the scenario with the highest Plant traffic impact. With the bulk of traffic expected to route along D1021 and the N1 towards the south, this intersection is therefore analysed, for both critical peak periods, for the chosen horizon year. A compounded growth rate of 4% per annum was applied to the 2017 background traffic counts.
- **The Operations Phase** is analysed for year 2035 with 2017 background traffic grown at 4% per annum. Road-based transport of coal and limestone sorbent is assumed.
- **The Operations Phase (Nearing intersection Capacity)** is analysed for year 2045 with 2017 background traffic grown at 4% per annum. Road-based transport of coal and limestone sorbent is assumed.

» **The Decommissioning Phase** is analysed for year 2055 with 2017 background traffic grown at 4% per annum. Road-based transport for removal of materials off-site is assumed.

12.11. N1/D1021 Intersection Capacity Analysis

Intersection Capacity Analysis was not carried out on the intersections along D777 in view of the low background traffic volumes and low development trips assigned to the areas north of the site.

Intersection Capacity Analysis of the critical N1/D1021 intersection was undertaken using the Signalised and Unsignalised Intersection Design Research Aid (SIDRA) analysis software program, Version 6.1 Plus, for the project life-cycle (Construction, Operations and Decommissioning Phases) including background traffic growth.

SIDRA default settings were used in the analysis and the 15-minute peak period is assessed.

Level of Service (LOS) definitions are shown in **Table 12.4** below:

Table 12.4: Level of Service Criteria (HCM)

LOS	Signalised Intersection and Traffic Roundabouts	Unsignalised Intersections
A	≤ 10 sec	≤ 10 sec
B	10-20 sec	10-15 sec
C	20-35 sec	15-25 sec
D	35-55 sec	25-35 sec
E	55-80 sec	35-50 sec
F	≥80 sec	≥50 sec

The existing intersection layout (see Fig below) was used in all the analysis.

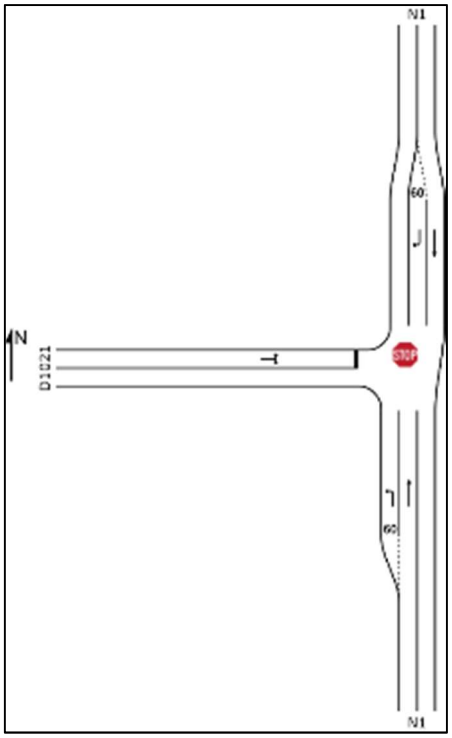

Figure 12-9: N1/D1021 Intersection Layout

The following conclusions can be drawn from observations on-site and from the intersection capacity analysis results:

12.11.1. Scenario 1 – Existing 2017 Traffic Conditions

Intersection N1/D1021:
The D1021 approach to the N1 operates at an acceptable LOS A in both the AM and PM Peaks in Year 2017, with LOS A on all intersection approaches, as observed on site.

12.11.2. Scenario 2 - 2025 Background Traffic Demand (4% pa Growth) with Construction Traffic

Intersection N1/D1021:
End of Construction Period. The D1021 approach to the N1 is expected to operate at an acceptable LOS B in the AM Peak and PM Peak, with LOS A on the N1 intersection approaches for both peak hours.

12.11.3. Scenario 3 - 2035 Background Traffic Demand (4% pa Growth) with Year 10 Operations Traffic

Intersection N1/D1021:
Year 10 of Operations Period.

A 4% compounded annual traffic growth was applied to 2017 background traffic over 18 years. The D1021 approach to the N1 is expected to operate at an acceptable LOS C, with LOS A on the N1 intersection approaches, for both peak hours in year 2035.

12.11.4. Scenario 4 – 2045 Background Traffic Demand (4% pa Growth) with Operations Traffic with Year 20 Operations.

Intersection N1/D1021:
A 4% compounded annual traffic growth was applied to 2017 background traffic over 33 years. The D1021 approach to the N1 is expected to operate at an LOS E, with LOS A on the N1 intersection approaches, for both peak hours in year 2045.

In Year 2050 the D1021 approach to N1 is expected to operate at LOS F, and an alternated intersection control will be required. A traffic roundabout (single circulatory lane with single lane on all approaches) will operate at a good LOS A for both peak hours.

12.11.5. Scenario 5 - 2055 Background Traffic Demand (4% pa Growth) with Decommissioning Traffic

Intersection N1/D1021:
A 4% compounded annual traffic growth was applied to 2017 background traffic over 43 years. It is assumed that the trips related to the Decommissioning Phase would be less than 50% of the Construction traffic. This depends on the decommissioning period and assume removal of materials from site by road over a 12 months period.

The D1021 approach to the N1 is expected to operate at a LOS F, unless the intersection is brought under traffic roundabout control. A traffic roundabout (single circulatory lane with single lane on all approaches) will operate at a good LOS A for both peak hours.

This aspect should be re-evaluated closer to the time and appropriate intersection control implemented.

13. IMPACT ASSESSMENT

13.1. Impact Assessment Methodology

The Impact Assessment Methodology assists in evaluating the overall effect of a proposed activity on the environment. The environmental impact is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts is undertaken through an assessment of the significance of the impacts.

13.2. Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence, as shown in Table 1.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact. Significance is calculated using the Impact Ratings System as described below.

13.3. Impact Rating System

Impact assessment takes account of the nature, scale and duration of the effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- Planning (*Not applicable in this instance – no traffic impact*)
- Construction
- Operation
- Decommissioning (*Not evaluated, will cope with short-term traffic of less intensity than compared to constructing traffic*)

Where necessary, the proposal for mitigation or optimisation of an impact is detailed. A brief discussion of the impact and the rationale behind the assessment of its significance is included.

A rating system is used to classify the impacts. The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. Impacts have been consolidated into one rating. In assessing the significance of each issue, the following criteria (including an allocated point system) is used:

Direct, indirect and cumulative impacts of the issues identified through the scoping study, as well as all other issues identified in the EIA phase must be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.

- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of Plant) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):

- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5;

- The **consequences (magnitude)**, quantified on a scale from 0-10, where
  - 0 - is small and will have no effect on the environment,
  - 2 - is minor and will not result in an impact on processes,
  - 4 - is low and will cause a slight impact on processes,
  - 6 - is moderate and will result in processes continuing but in a modified way,
  - 8 - is high (processes are altered to the extent that they temporarily cease), and
  - 10 - is very high and results in complete destruction of patterns and permanent cessation of processes.

- The **probability** of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where

- 1 - is very improbable (probably will not happen),
- 2 - is improbable (some possibility, but low likelihood),
- 3 - is probable (distinct possibility),
- 4 - is highly probable (most likely) and
- 5 - is definite (impact will occur regardless of any prevention measures).

» the **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and

» the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the degree to which the impact can be mitigated.

The **significance** is calculated by combining the criteria in the following formula:
S=(E+D+M)P

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:
» < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
» 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
» 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Assessment of impacts are summarised in table format. The rating values as per the above criteria are included. The table and associated ratings are completed for **each** impact identified during the assessment.

13.4. Impact Assessment

The impact assessment undertaken in accordance with the above methodology is shown in **Table** 13.2 to **Table 13.9**: Ratings of impacts – Cumulative

Table 13.7below.

Table 13.1: Ratings of impacts (Traffic Safety) – Construction Phase

IMPACT TABLE – CONSTRUCTION PHASE		
Nature Increase in traffic volumes (heavy and light vehicles) on the N1, between affected staff residential areas and the Mutsho Power Plant, increasing the probability of accidents.		
	Without mitigation	**With mitigation**
Extent	(Local) 2	(Local) 2
Duration	(Short-term) 2	(Short-term) 2
Intensity/magnitude	(Moderate) 6	(Low) 5
Probability	(High) 4	(High) 4
Significance rating	(Medium) 40	(Low) 36
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Yes	Yes
Can the impacts be mitigated	Yes	No
Mitigation: Place signage on the affected section of the N1 warning of possible presence of construction vehicles. Ensure construction related vehicles are adequately maintained and are roadworthy.		
Residual Risks: None.		

Table 13.2: Ratings of impacts (Road Integrity and Dust) – Construction Phase

IMPACT TABLE – CONSTRUCTION PHASE		
Nature Increase in traffic volumes (heavy and light vehicles) on low volume gravel roads (D744 and D1021) resulting in deterioration of the road and increased dust.		
	Without mitigation	**With mitigation**
Extent	(Local) 2	(Local) 2
Duration	(Short-term) 2	(Short-term) 2
Intensity/magnitude	(Low) 4	(Low) 3
Probability	(High) 4	(High) 4
Significance rating	(Medium) 32	(Low) 28
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can the impacts be mitigated	Yes	No
Mitigation: Gravel roads (relevant section of D744 and D1021) used for access to the Plant should be hard surfaced to accommodate increased vehicle traffic and to reduce dust.		
Residual Risks: Hard surfaced roads may lead to speeding. Speed restrictions signage should be provided to promote safe travelled speeds appropriate to the road design.		

Table 13.3: Ratings of impacts (Pedestrian Road Safety) – Construction Phase

IMPACT TABLE – CONSTRUCTION PHASE		
Nature Increase in traffic volumes (heavy and light vehicles) impacts on road safety, particularly in Mopane and along gravel roads D744 and D1021 with no clear space for pedestrians. Presence of cattle / animals in the travelled way also compromises road safety.		
	Without mitigation	**With mitigation**
Extent	(Local) 2	(Local) 2
Duration	(Long-term) 2	(Long-term) 2
Intensity/magnitude	(Low) 4	(Low) 2
Probability	(High) 4	(High) 4
Significance rating	(Medium) 32	(Low) 24
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Yes	Yes
Can the impacts be mitigated	Yes	No
Mitigation: Sidewalks should be provided along D777 in Mopane to separate pedestrians from Plant / through traffic. Gravel roads (relevant section of D744 and D1021) up to the Plant should be hard surfaced to accommodate increased vehicle traffic. A raised sidewalk should be provided along at least one side of the roadway to accommodate pedestrians. Signage alerting motorists to pedestrians and possible animals should also be erected along these routes.		
Residual Risks: Increased traffic volumes will increase road safety risk to pedestrians crossing / walking in the roadway.		

Table 13.4: Ratings of impacts (Traffic Safety) – Operations Phase

IMPACT TABLE – CONSTRUCTION PHASE		
Nature Increase in traffic volumes (heavy and light vehicles) on the N1, between affected staff residential areas and the Mutsho Power Plant, increasing the probability of accidents.		
	Without mitigation	**With mitigation**
Extent	(Local) 2	(Local) 2
Duration	(Long-term) 4	(Long-term) 4
Intensity/magnitude	(Moderate) 6	(Minor) 2
Probability	(High) 4	(High) 4
Significance rating	(Medium) 48	(Medium) 32
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Yes	Yes
Can the impacts be mitigated	Yes	No
Mitigation: Ensure that construction vehicles are maintained and in a roadworthy condition. Preferably transport coal and limestone by rail to reduce heavy vehicle numbers and reduce risk of vehicle collisions.		

IMPACT TABLE – CONSTRUCTION PHASE
Residual Risks: None.

Table 13.5: Ratings of impacts (Road Maintenance – N1) – Operations Phase

IMPACT TABLE – CONSTRUCTION PHASE		
Nature Increase in traffic volumes (heavy vehicles) on the N1 and more particularly the northbound lane between affected staff residential areas and the Mutsho Power Plant, will impact on road pavement and require increased road maintenance.		
	Without mitigation	**With mitigation**
Extent	(Local) 2	(Local) 2
Duration	(Long-term) 4	(Long-term) 4
Intensity/magnitude	(Moderate) 6	(Low) 2
Probability	(High) 4	(Improbable) 2
Significance rating	(Medium) 48	(Low) 16
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can the impacts be mitigated	Yes	No
Mitigation: Transport coal by rail to reduce numbers of heavy vehicles on the N1.		
Residual Risks: None.		

Table 13.6: Ratings of impacts (Road Integrity and Dust) – Operations Phase

IMPACT TABLE – OPERATIONS PHASE		
Nature Increase in traffic volumes (heavy and light vehicles) on low volume gravel roads results in deterioration of the low order gravel roads (D744 and D1021) and causes increased dust (nuisance and road safety issue).		
	Without mitigation	**With mitigation**
Extent	(Local) 2	(Local) 2
Duration	(Long-term) 4	(Long-term) 4
Intensity/magnitude	(Low) 4	(Minor) 2
Probability	(High) 4	(High) 4

IMPACT TABLE – OPERATIONS PHASE		
Significance rating	(Medium) 40	(Medium) 32
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can the impacts be mitigated	Yes	No
Mitigation: Gravel roads (relevant section of D744 and D1021) up to the Plant should be hard surfaced to accommodate increased vehicle traffic and to cut down on dust.		
Residual Risks: Hard surfaced roads may lead to speeding. Speed restriction signage should be provided to promote safe travelled speeds appropriate to the road design.		

Table 13.7: Ratings of impacts (Pedestrian Road Safety) – Operations Phase

IMPACT TABLE – OPERATIONS PHASE		
Nature Increase in traffic volumes (heavy and light vehicles) impacts on road safety, particularly in Mopane and along gravel roads with no clear space for pedestrians. Presence of cattle/animals in the travelled way also compromises road safety.		
	Without mitigation	**With mitigation**
Extent	(Local) 2	(Local) 2
Duration	(Long-term) 4	(Long-term) 4
Intensity/magnitude	(Low) 4	(Minor) 2
Probability	(High) 4	(High) 4
Significance rating	(Medium) 40	(Medium) 32
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Yes	Yes
Can the impacts be mitigated	Yes	No
Mitigation: Sidewalks should be provided along D777 in Mopane to separate pedestrians from Plant / through traffic. Gravel roads (relevant section of D744 and D1021) up to the Plant should be hard surfaced to accommodate increased vehicle traffic and to cut down on dust. A raised sidewalk should be provided along at least one side of the roadway to accommodate pedestrians. Signage alerting motorists to pedestrians and possible animals should also be erected along these routes.		
Residual Risks: Increased traffic volumes will increase road safety risk to pedestrians in the roadway.		

Table 13.8: Ratings of impacts (Pedestrian Road Safety) – Decommissioning Phase

IMPACT TABLE – OPERATIONS PHASE		
Nature Increased traffic volumes on N1 due to traffic growth will make exit from the D1021 priority-controlled junction with the N1 problematic and will impact on road safety with increased risk of vehicle collisions.		
	Without mitigation	**With mitigation**
Extent	(Local) 2	(Local) 2

IMPACT TABLE – OPERATIONS PHASE		
Duration	(Short-term) 1	(Short-term) 1
Intensity/magnitude	(Medium) 6	(Low) 2
Probability	(High) 4	(High) 4
Significance rating	(Medium) 36	(Low) 20
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Yes	Yes
Can the impacts be mitigated	Yes	No
Mitigation: Transport equipment and materials off-site by rail to reduce numbers of heavy vehicles entering the N1 from D1021.		
Residual Risks: None		

Table 13.9: Ratings of impacts – Cumulative

IMPACT TABLE – CUMULATIVE		
Nature The potential cumulative impacts of other industrial-type developments proposed and operational within the region are explored. The Syerfontein Mine traffic is already included in the traffic count Increase in background traffic volumes (heavy and light vehicles) at 4% per annum are considered in the N1/D1021 intersection analysis. This accounts for increase in traffic from new developments wider afield. The additional traffic associated with the Mutsho Power Project is acceptable and the cumulative impact of the Mutsho Power Project is of low significance. The impact of growth in background traffic will impact on the D1021/N1 intersection in time.		
	Without mitigation	**With mitigation**
Extent	(Local) 2	(Local) 2
Duration	(Long-term) 4	(Long-term) 4
Intensity/magnitude	(Medium) 3	(Low) 1
Probability	(High) 4	(Probable) 3
Significance rating	(Medium) 36	(Low) 21
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can the impacts be mitigated	Yes	No
Mitigation: Upgrade the D1021/N1 intersection to a traffic roundabout when warranted or transport raw materials to site by rail during the Operational Phase. Transport some materials off-site by rail during the Decommissioning Phase.		
Residual Risks: NA		

Table 13.10: Environmental Management Programme

OBJECTIVE: To construct, operate (and decommission) a Coal Power Plant on the subject properties.	
Project Component/s	1. Section of N1 between Makhado and Musina. 2. Section of D777 between N1 and D744 near Mopanie. 3. Section of gravel road D777 (between D744 and D1021). 4. Gravel road D1021 (complete road from N1 to D777).
Potential Impact	1. Vehicles travelling on gravel roads (D1021 and D777) will result in dust carrying onto nearby farms, reduced sight distance for drivers and pedestrians, deterioration of gravel roads and increased risk of collision. 2. Increased risk of collision with pedestrians and cattle in Mopanie. 3. Increased risk of accidents on the N1 with increase in vehicle numbers. 4. Poor level of service on D1021 approach to the N1, expected from around Year 2045 depending on rate of increase in traffic volumes on the N1. 5. Increased number of heavy vehicles on the N1 would impact on the road pavement, requiring more regular maintenance.
Activities/Risk Sources	1. During the Construction Phase increased number of vehicles (light and heavy) on N1 and D777, D744 and D1021. 2. During Operations Phase Heavy vehicles transporting coal and limestone to the Power Plant throughout the day. 3. During Decommissiong Phase Heavy vehciles transporting materials from the Power Plant.
Mitigation: Target/Objective	1. Reduce traffic impact by ensuring safe traffic flow and reducing the likelihood of crashes.

Mitigation: Action/Control	Responsibility	Timeframe
1. Hard surface gravel roads serving the Power Plant (i.e. D777 and D1021). 2. Provide raised sidewalk along at least on side eof the D777 and D1021. 3. Provide speed restriction signage on D777 and D1021. 4. Provide sidewalks in Makhado for pedestrian road safety. 5. Provide appropriate signage on N1 informing of likelihood of construction vehicles during the construction phase. 6. Reassess Level of Service (LOS) on D1021 approach to N1 in year 2045 (or sooner if deemed necessary) and upgrade the priority controlled intersection to a traffic roundabout when required. 7. Preferable to Point 6 above, construct a rail line and siding to transport coal and limestone by rail to the Power Plant for the Operational Period. 8. Use rail to transport materials from site during the decommissioning phase, as opposed to only using road based transport. 9. Ensure vehicles are in a roadworthy condition.	(1-8) Power Utility (9) Vehicle operator and Provincial Traffic Law Enforcement.	(1-4) Prior to Construction on Power Plant. (5) At start of Construction Phase and for duration of Construction. (6) In Year 2045 or sooner if required. (7) During the Operations Phase and will become more required as traffic volumes increase on the N1. (8) During the Plant Decommissioning Phase. (9) Duration of Project life cycle.

Performance Indicator	Level of Service (LOS) on D1021 approach to the N1.
Monitoring	Monitor vehicle queues on the D1021 approach to the N1 and assess LOS when access to the N1 becomes more difficult, resulting in more delay and longer vehicle queues developing on the D1021. It is anticipated that access to the N1 will become more problematic from Year 2045.

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14. CONCLUSIONS AND RECOMMENDATIONS

It is concluded that;

1. The proposed Mutsho Power Plant trip generation will peak during the 4 to 5 years Construction Phase;
2. Abnormal Load vehicles will be required to transport various components to the site during the construction phase;
3. Overland conveyor system will transport coal and conditioned ash on the project site;
4. Gravel service roads (on-site) will be used for maintenance purposes and will also serve as back up should conveyors fail on occasion;
5. The N1, D777 and D744 will provide access to the site from the north (Musina);
6. The N1 and D1021 will provide access from the south to the site (from Makhado and surrounding towns);
7. The bulk of the Mutsho Power Project traffic will route along the D1021 and along the N1 towards Makhado in the south;
8. The critical N1/D1021 intersection approaches will yield acceptable Levels of Service in the Construction Phase (and also during the Operations Phase until Year 2045, as assessed). Thereafter the intersection should be re-evaluated and possibly a traffic roundabout would need to be considered to improve the Level of Service on the D1021 approach to the N1;
9. The gravel roads (D744 and D1021) will need to be hard surfaced to prevent dust (environmental, road safety and pedestrian safety issues) and to provide an acceptable road surface for the Plant traffic (road maintenance, vehicle accessibility, road safety issues);
10. A raised sidewalk on at least one side of the D1021 and D777, should be provided for pedestrian safety,
11. Signage should be erected along the D1021 and D744 warning motorists of possible pedestrians and cattle/animals along the road;
12. Increase in heavy vehicles (transporting coal) on the N1 during the 30 years Operations Phase will result in deterioration of the N1 pavement structure and will require more regular maintenance;
13. Increase in heavy vehicles (transporting coal) on the N1 during the 30 years Operations Phase will increase the probability of accidents on the N1;
14. Considering the traffic impact on the N1 during the Operations Phase it is preferable that coal be transported to the Mutsho Power Plant by rail.
15. The critical N1/D1021 intersection approaches will yield poor Levels of Service in the Decommissioning Phase (and also during the Operations Phase around Year 2050, as assessed). At this point in time, the intersection should be re-evaluated and possibly a traffic roundabout would need to be considered to improve the Level of Service on the D1021 approach to the N1.

It is recommended that:

1. Site access design be submitted for approval when the development planning is undertaken;
2. The gravel roads (D744 and D1021) be hard surfaced to prevent dust and to provide an acceptable road surface for the Plant traffic;
3. A raised sidewalk be provided on at least one side of the D1021 and D777, for pedestrian safety,
4. Signage be erected along the D1021 and D744 warning motorists of possible pedestrians and cattle/animals along the roads;
5. Appropriate speed restriction signage be erected along the D1021 and D744 to inform motorists of safe operating speed;

6. Signage be erected along the N1 warning motorists of increased higher numbers of construction related vehicles on the affected section of road during the Construction period;
7. Construction and transport vehicles be maintained and kept in roadworthy condition;
8. Monitor vehicle queues on the D1021 approach to the N1, and upgrade the intersection to a traffic roundabout where required;
9. Consideration be given to transporting fuel (coal) to the Plant by rail instead of road. Fewer heavy vehicles on the N1 would reduce risk of traffic accidents. Reduced Heavy Vehicle axle loading on the N1 would also reduce road maintenance costs. The D1021 approach to N1 should then operate acceptably over the Plant life-cycle and obviate the possible need for a traffic roundabout towards the end of the Plant operational period.

15. REFERENCES

1. TMH 16 Vol 1 & 2 South African Traffic Impact and Site Traffic Assessment Manual, August 2012, compiled by the Committee of Transport Officials (COTO).

2. South African Trip Generation Rates, Second Edition, Department of Transport – June 1995

3. Institute of Transport Engineers Trip Generation Manual 8th Edition

4. http://www.mmegi.bw/index.php?sid=4&aid=322&dir=2010/February/Monday22

APPENDIX A: SITE DRAWING

NOT AVAILABLE AT TIME OF THIS REPORT

APPENDIX B: PICTURES

D744 NEAR D1021	
 D744 view south towards D1021	 D744 view south towards D1021
 D744 view south towards D1021 intersection	 Signage on D744
 D744 - Exposed culvert	 D744 – Drift (low water course crossing)

 D744 soft sand	 D744 Vertical alignment restricting sight distance viewed towards D102
 D744 – soft sand towards Mopane	 Horizontal Curve viewing towards south (towards D1021 ahead on left)
 Inside horizontal curve viewing to north (i.e. access to site along D744 will need to be carefully considered in design stage)	

D777 IN AND NEAR MOPANE	
 Cattle on D777 in Mopane	 D777/ local street (to station and hostel) intersection
 Station entrance on local street in Mopane	 D777 in Mopane (lack of sidewalks for pedestrians)
 D777/access to Mopane School Hostel	 D777 westbound approach to Mopane (note pedestrians and commuter waiting for taxi/bus)

N1/D777 INTERSECTION	
 N1/D777 Intersection (view towards N1 along D777)	 N1/D777 Intersection (view from N1 along D777)
 N1/D777 Intersection (view north along N1)	 N1/D777 Intersection (view south along N1, towards the Boabab Toll Plaza)

D777 IN AND NEAR MOPANE	
 D777 looking east towards rail level crossing	 D777 looking west towards Mopane from rail level crossing
 Level crossing on D777 in Mopane viewing north	 Level crossing on D777 in Mopane viewing south
 D777 exiting Mopane viewing towards bend before railway level crossing	 D777 (approach from N1) viewing towards Mopane
 D777 viewing towards school hostel access	

D744 NEAR MOPANE	
 D744 towards Mopane (soft sand on gravel road)	 D744 towards Mopane (soft sand on gravel road)
 DR744 towards Mopane (soft sand on gravel)	 DR744 towards Mopane (last 3 km better graded)
 D744/D777 intersection	 D744/D777 Mopanie ahead
 D744 viewed from D777	 D744 viewed from D777

 D777 looking west from D744 intersection	

N1/D1021 INTERSECTION	
	
N1/D1021 intersection (looking east towards N1)	N1/D1021 intersection (looking west along D102)
	
N1/D1021 intersection (looking north along N1)	N1/D1021 intersection (looking south along N1)
	
N1/D1021 intersection (looking north along N1)	N1/D1021 intersection (looking south along N1)
	
N1/D1021 intersection (bleeding road surface bleeding on N1	N1/D1021 intersection (looking north along N1

 N1/D1021 intersection (pavement distress on N1)	

D1021	
 D1021 viewed west (near possible site access location)	 D1021 viewed east (near possible site access location)
 Livestock herded/crossing D1021	 D1021 looking west towards Huntleigh
 D1021 - railway line level crossing	 D1021 - railway line level crossing warning signage
 D1021 - Sight line to north at rail level crossing limited by narrow cutting and rail line geometry	 D1021 - Sight line at rail level crossing ok to south

 D102/D744 intersection (looking west towards D744)	 D102/D744 intersection (view from D744 looking east towards level crossing on D1021)
 D744/D1021 intersection - view along D744 towards Mopane	

APPENDIX C: INTERSECTION ANALYSIS RESULTS

MOVEMENT SUMMARY

Site: AM 2025 - With Dev

Makhado Coal
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: N1											
1	L2	220	27.8	0.142	5.9	LOS A	0.0	0.0	0.00	0.57	52.4
2	T1	153	21.4	0.089	0.0	LOS A	0.0	0.0	0.00	0.00	119.9
Approach		373	25.1	0.142	3.5	NA	0.0	0.0	0.00	0.34	68.1
North: N1											
8	T1	113	30.8	0.069	0.0	LOS A	0.0	0.0	0.00	0.00	119.9
9	R2	39	27.0	0.050	8.2	LOS A	0.2	1.6	0.47	0.68	50.2
Approach		152	29.9	0.069	2.1	NA	0.2	1.6	0.12	0.17	88.4
West: D1021											
10	L2	7	28.6	0.101	10.3	LOS B	0.4	3.2	0.52	0.97	47.8
12	R2	39	27.0	0.101	15.1	LOS C	0.4	3.2	0.52	0.97	47.7
Approach		46	27.3	0.101	14.3	LOS B	0.4	3.2	0.52	0.97	47.7
All Vehicles		571	26.6	0.142	4.0	NA	0.4	3.2	0.07	0.35	69.9

MOVEMENT SUMMARY

Site: PM 2025 - with Dev

Makhado Coal
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: N1											
1	L2	39	27.0	0.025	5.9	LOS A	0.0	0.0	0.00	0.57	52.5
2	T1	113	30.8	0.069	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		152	29.9	0.069	1.5	NA	0.0	0.0	0.00	0.15	57.9
North: N1											
8	T1	153	21.4	0.089	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	7	28.6	0.007	6.6	LOS A	0.0	0.2	0.29	0.56	51.1
Approach		160	21.7	0.089	0.3	NA	0.0	0.2	0.01	0.03	59.5
West: D1021											
10	L2	39	27.0	0.462	11.7	LOS B	3.1	26.4	0.57	1.06	47.4
12	R2	220	27.8	0.462	15.9	LOS C	3.1	26.4	0.57	1.06	47.2
Approach		259	27.6	0.462	15.3	LOS C	3.1	26.4	0.57	1.06	47.2
All Vehicles		571	26.6	0.462	7.4	NA	3.1	26.4	0.26	0.53	52.8

MOVEMENT SUMMARY

Site: AM 2035 - with Dev

Makhado Coal
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: N1											
1	L2	48	80.4	0.041	6.5	LOS A	0.0	0.0	0.00	0.56	50.4
2	T1	226	21.9	0.133	0.0	LOS A	0.0	0.0	0.00	0.00	119.9
Approach		275	32.2	0.133	1.2	NA	0.0	0.0	0.00	0.10	96.3
North: N1											
8	T1	166	31.0	0.102	0.0	LOS A	0.0	0.0	0.00	0.00	119.9
9	R2	3	0.0	0.003	6.7	LOS A	0.0	0.1	0.38	0.56	52.1
Approach		169	30.4	0.102	0.1	NA	0.0	0.1	0.01	0.01	117.1
West: D1021											
10	L2	3	0.0	0.183	9.4	LOS A	0.7	7.8	0.65	1.00	45.6
12	R2	48	80.4	0.183	22.6	LOS C	0.7	7.8	0.65	1.00	43.0
Approach		52	75.5	0.183	21.8	LOS C	0.7	7.8	0.65	1.00	43.2
All Vehicles		496	36.1	0.183	3.0	NA	0.7	7.8	0.07	0.16	90.2

MOVEMENT SUMMARY

Site: PM 2035 - with Dev

Makhado Coal
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: N1											
1	L2	48	80.4	0.041	6.5	LOS A	0.0	0.0	0.00	0.56	50.4
2	T1	166	31.0	0.102	0.0	LOS A	0.0	0.0	0.00	0.00	119.9
Approach		215	42.2	0.102	1.5	NA	0.0	0.0	0.00	0.13	91.3
North: N1											
8	T1	226	21.9	0.133	0.0	LOS A	0.0	0.0	0.00	0.00	119.9
9	R2	3	0.0	0.003	6.4	LOS A	0.0	0.1	0.34	0.55	52.2
Approach		229	21.6	0.133	0.1	NA	0.0	0.1	0.00	0.01	117.8
West: D1021											
10	L2	3	0.0	0.182	9.0	LOS A	0.7	7.8	0.64	0.99	45.7
12	R2	48	80.4	0.182	22.6	LOS C	0.7	7.8	0.64	0.99	43.0
Approach		52	75.5	0.182	21.8	LOS C	0.7	7.8	0.64	0.99	43.2
All Vehicles		496	36.1	0.182	3.0	NA	0.7	7.8	0.07	0.16	90.2

MOVEMENT SUMMARY

Site: AM 2045 - with Dev

Makhado Coal
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: N1											
1	L2	48	80.4	0.041	6.5	LOS A	0.0	0.0	0.00	0.56	50.4
2	T1	335	21.7	0.196	0.0	LOS A	0.0	0.0	0.00	0.00	119.8
Approach		383	29.1	0.196	0.8	NA	0.0	0.0	0.00	0.07	102.0
North: N1											
8	T1	246	30.8	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	119.9
9	R2	3	0.0	0.003	7.3	LOS A	0.0	0.1	0.45	0.59	51.7
Approach		249	30.4	0.152	0.1	NA	0.0	0.1	0.01	0.01	117.9
West: D1021											
10	L2	3	0.0	0.305	13.0	LOS B	1.2	13.5	0.82	1.06	39.2
12	R2	48	80.4	0.305	36.7	LOS E	1.2	13.5	0.82	1.06	37.3
Approach		52	75.5	0.305	35.2	LOS E	1.2	13.5	0.82	1.06	37.4
All Vehicles		684	33.1	0.305	3.2	NA	1.2	13.5	0.06	0.12	94.3

MOVEMENT SUMMARY

Site: PM 2045 - with Dev

Makhado Coal
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: N1											
1	L2	48	80.4	0.041	6.5	LOS A	0.0	0.0	0.00	0.56	50.4
2	T1	246	30.8	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	119.9
Approach		295	38.9	0.152	1.1	NA	0.0	0.0	0.00	0.09	97.6
North: N1											
8	T1	335	21.7	0.196	0.0	LOS A	0.0	0.0	0.00	0.00	119.8
9	R2	3	0.0	0.003	6.8	LOS A	0.0	0.1	0.40	0.57	52.0
Approach		338	21.5	0.196	0.1	NA	0.0	0.1	0.00	0.01	118.4
West: D1021											
10	L2	3	0.0	0.305	12.3	LOS B	1.2	13.5	0.81	1.04	39.2
12	R2	48	80.4	0.305	36.7	LOS E	1.2	13.5	0.81	1.04	37.3
Approach		52	75.5	0.305	35.2	LOS E	1.2	13.5	0.81	1.04	37.4
All Vehicles		684	33.1	0.305	3.2	NA	1.2	13.5	0.06	0.12	94.3

MOVEMENT SUMMARY

Site: AM 2055 - with Dev

Makhado Coal
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: N1											
1	L2	25	79.2	0.021	6.5	LOS A	0.0	0.0	0.00	0.56	50.4
2	T1	495	21.7	0.290	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		520	24.5	0.290	0.4	NA	0.0	0.0	0.00	0.03	59.4
North: N1											
8	T1	365	30.8	0.225	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
9	R2	2	0.0	0.003	8.3	LOS A	0.0	0.1	0.52	0.62	51.0
Approach		367	30.7	0.225	0.1	NA	0.0	0.1	0.00	0.00	59.9
West: D1021											
10	L2	2	0.0	0.366	22.2	LOS C	1.2	13.9	0.93	1.06	28.4
12	R2	25	79.2	0.366	75.1	**LOS F**	1.2	13.9	0.93	1.06	27.3
Approach		27	73.1	0.366	71.0	**LOS F**	1.2	13.9	0.93	1.06	27.4
All Vehicles		915	28.4	0.366	2.4	NA	1.2	13.9	0.03	0.05	57.6

MOVEMENT SUMMARY

Site: PM 2055 - with Dev

Makhado Coal
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: N1											
1	L2	25	79.2	0.021	6.5	LOS A	0.0	0.0	0.00	0.56	50.4
2	T1	365	30.8	0.225	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		391	34.0	0.225	0.4	NA	0.0	0.0	0.00	0.04	59.2
North: N1											
8	T1	495	21.7	0.290	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
9	R2	2	0.0	0.002	7.4	LOS A	0.0	0.1	0.46	0.59	51.6
Approach		497	21.6	0.290	0.1	NA	0.0	0.1	0.00	0.00	59.9
West: D1021											
10	L2	2	0.0	0.366	21.0	LOS C	1.2	13.9	0.93	1.06	28.4
12	R2	25	79.2	0.366	75.1	**LOS F**	1.2	13.9	0.93	1.06	27.4
Approach		27	73.1	0.366	70.9	**LOS F**	1.2	13.9	0.93	1.06	27.4
All Vehicles		915	28.4	0.366	2.3	NA	1.2	13.9	0.03	0.05	57.6

MOVEMENT SUMMARY

Site: AM 2055 - with Dev - Roundabout

Makhado Coal
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: N1											
1	L2	25	79.2	0.325	4.0	LOS A	2.5	21.1	0.04	0.34	54.6
2	T1	495	21.7	0.325	3.7	LOS A	2.5	21.1	0.04	0.34	58.0
Approach		520	24.5	0.325	3.7	LOS A	2.5	21.1	0.04	0.34	57.8
North: N1											
8	T1	365	30.8	0.267	4.0	LOS A	2.1	18.4	0.21	0.34	56.8
9	R2	2	0.0	0.267	9.4	LOS A	2.1	18.4	0.21	0.34	57.7
Approach		367	30.7	0.267	4.0	LOS A	2.1	18.4	0.21	0.34	56.8
West: D1021											
10	L2	2	0.0	0.044	6.2	LOS A	0.2	2.6	0.64	0.69	50.1
12	R2	25	79.2	0.044	15.1	LOS B	0.2	2.6	0.64	0.69	49.4
Approach		27	73.1	0.044	14.4	LOS B	0.2	2.6	0.64	0.69	49.5
All Vehicles		915	28.4	0.325	4.1	LOS A	2.5	21.1	0.13	0.35	57.1

MOVEMENT SUMMARY

Site: PM 2055 - with Dev - Roundabout

Makhado Coal
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: N1											
1	L2	25	79.2	0.255	4.0	LOS A	1.8	16.2	0.03	0.34	54.7
2	T1	365	30.8	0.255	3.7	LOS A	1.8	16.2	0.03	0.34	57.8
Approach		391	34.0	0.255	3.7	LOS A	1.8	16.2	0.03	0.34	57.6
North: N1											
8	T1	495	21.7	0.342	3.9	LOS A	2.9	23.9	0.22	0.34	56.9
9	R2	2	0.0	0.342	9.4	LOS A	2.9	23.9	0.22	0.34	57.6
Approach		497	21.6	0.342	3.9	LOS A	2.9	23.9	0.22	0.34	56.9
West: D1021											
10	L2	2	0.0	0.039	5.5	LOS A	0.2	2.3	0.58	0.65	51.0
12	R2	25	79.2	0.039	13.8	LOS B	0.2	2.3	0.58	0.65	50.3
Approach		27	73.1	0.039	13.1	LOS B	0.2	2.3	0.58	0.65	50.3
All Vehicles		915	28.4	0.342	4.1	LOS A	2.9	23.9	0.15	0.35	57.0

APPENDIX D: CURRICULUM VITAE – SM FAUTLEY

TECHSO
smart solutions

S Fautley
Abbreviated Curriculum Vitae

Profession
Traffic & Transportation Engineer

Current Position
Western Cape
Senior Transportation Engineer

Date and Place of Birth:
15 July 1961, Cape Town

Joined Techso:
2008

Nationality
South African

Academic Qualifications
NHD in Civil Engineering, Cape Technikon 1989

Professional Associations
The Engineering Council of South African (ECSA)

Specialisation
Traffic Engineering and Transportation Planning

Languages
Afrikaans, English

Appointments
- 1986– 1992: Principal Industrial and (1986 - 1991) Industrial Technician: Geometric Design: Provincial Administration, Western Cape
- 1993– 1994: Chief Industrial Technician: Mapping and Proclamations: Provincial Government: Western Cape
- 1994 – 1995: Chief Industrial Technician Regional Services: Provincial Government: Western Cape
- 1995 - 1996: Chief Industrial Technician. Urban Transportation: Provincial Government: Western Cape
- 1997 – 1998: Senior Technician, Kantey and Templer
- 1998 - 2006: Principal Technician: Traffic Engineering, City of Cape Town
- 2006 – 2008: Regional Head, Traffic Impact Assessments and Development Control, City of Cape Town
- 2008 - Senior Transportation Engineer, Techso

Contact Details
Phone: +27 (0) 21 5577730
Mobile: +27 (0) 84 300 7722
E-mail: steve@techso.co.za

Key Experience

Stephen is a traffic engineering technologist with 30 years of experience in traffic and transportation engineering. He has completed the Transportation Planning and Study Methodology course and the Highway Capacity course at the University of Stellenbosch. Stephen has been involved with civil, traffic and transportation engineering for ten (10) years at Provincial Government of the Western Cape, 1.5 years with Kantey and Templer Consulting Engineers and 10 yrs at local authority/city level and joined Techso in August 2008.

Traffic & Transportation:
- Transportation Planning
- Traffic Engineering
- Road Safety Audits

Projects:
- Local Traffic Engineering and Transportation Plans, such as Traffic Signal Design, Traffic Calming, Parking, Road Safety Audits, Road Design, Road Signs and Lane Marking for City of Cape Town.
- Developed Structure Parking Ramp Design Guidelines for the City of Cape Town.
- Project Management, Blaauwberg Road and Diep River Bridge Design, Milnerton
- Transport Systems Management Project Design and Implementation (City of Tygerberg & City of Cape Town)
- Technical Input to the City of Cape Town Kerbside Adjudication Bid Evaluation Committee.
- Project Management sub consultant: City of Cape Town Integrated Rapid Transport intersection and traffic signal design.
- Traffic Engineer sub-consultant: City of Cape Town - Conceptual design of Eastern Region non motorised transport project
- Transport Impact Assessments – Commercial and Residential Developments, Schools, Gym, Hospital, Service Stations, Building lines, Sand-mines, Road Closures, Extensive housing development and road improvements
- Transportation Modelling – TIA for Windhoek Prime Ministers Offices
- Rustenburg Municipality – Integrated Rapid Transport System – AFC
- Ekhuruleni Municipality – Integrated Rapid Public Transport Network – AFC and APTMS
- Nelson Mandela Bay Municipality – Integrated Public Transport System – AFC and APTMS
- Assessment of Road Safety Risk and Enforcement Measures -Various Municipal Area
- Traffic Management Plans - R21/2 in Gauteng – SANRAL
- Road Safety Audits – City of Cape Town - Integrated Rapid Transit Phase 1B, and R27 Reversible Bus lane, SANRAL- N1 in Polokwane
- Transport Studies – Input to Various Environmental Impact Assessment and Land Use Applications (residential developments, renewable energy plants, power stations, mines, industrial sites)
- **RESIDENTIAL / HOUSING:**
  - TIA – Erf 2900 Lotus River (58 Unit housing development - flats)
  - TIA – Rhodes square student accommodation in Mowbray (600 units – for UCT students)
  - TIA – Campuskey Student Residence in Newlands (560 units - for UCT students)
  - TIA – The Nest Student Residence and commercial development in Rosebank (for 610 units for UCT students)
  - TIS Erf 309 – 44 Units flats Milnerton

APPENDIX E: DETAILS OF SPECIALIST AND DECLARATION

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEAT/EIA
Date Received:	2017/08/21

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010; and

(2) National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 718, 2009

PROJECT TITLE

Development of the Mutsho Power Project and associated infrastructure near Makhado (Louis Trichardt), Limpopo Province.

Specialist:	Traffic Engineer		
Contact person:	Stephen Mark Fautley		
Postal address:	Unit 1 B 4, The Avenues, Cnr Parklands Main and Village Walk, Parklands		
Postal code:	7441	Cell:	0843007722
Telephone:	021 55 777 30	Fax:	
E-mail:	Steve@techso.co.za		
Professional affiliation(s) (if any)	ECSA (200270171) and SAICE (201500599)		

Project Consultant:	Savannah Environmental (Pty) Ltd		
Contact person:	Jo-Anne Thomas		
Postal address:	P.O. Box 148 Sunninghill		
Postal code:	2157	Cell:	082 775 5628
Telephone:	011 656 3237	Fax:	086 684 0547
E-mail:	joanne@savannahsa.com		

4.2 The specialist appointed in terms of the Regulations_

I, Stephen Mark Fautley , declare that --

General declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Techso (Pty) Ltd

Name of company (if applicable):

2017/08/21

Date: