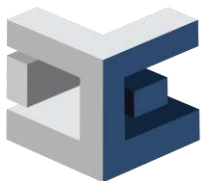




PROPOSED EXPANSION OF EXXARO'S DORSTFONTEIN EAST COAL MINE, KRIEL, MPUMALANGA PROVINCE



TRAFFIC IMPACT ASSESSMENT REPORT

**SEPTEMBER 2021
REVISION 1**



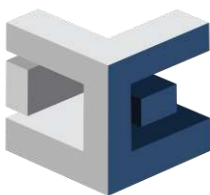
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CONTENTS

1	Introduction	5
1.1	Abbreviations	5
2	Site Location	6
2.1	Site Location	6
3	Surrounding Road Network and Traffic Flow	7
3.1	Surrounding Road Network	7
3.2	Future Road Network	7
3.3	Existing Traffic Flows	8
4	Proposed Development & Trip Generation	9
4.1	Proposed Development Expansion	9
4.2	Trip Generation	9
4.3	Latent Rights	10
5	Queueing Analysis & Site Access	11
5.1	Queueing Analysis	11
5.2	Site Access	12
5.3	Sight Distance at the Access (SSD)	12
5.4	Shoulder Sight Distance	13
5.5	Access Safety	13
6	Traffic Flows and Distribution	14
6.1	Trip Distribution	14
7	Traffic Impact & Capacity Analyses	15
7.1	R547 & R544	15
7.2	R544 & D1947 North	16
7.3	R544 & D1947 South	16
8	Road and / or Intersection Upgrades	17
8.1	Proposed Road Upgrades	17
9	Public Transport Assessment	18
9.1	Pedestrian Walkways & Crossings	18
9.2	Public Transport Facilities	18
10	Conclusions & Recommendations	19
11	Bibliography	20

Figures

- Figure 1 Locality Plan
- Figure 2 Existing 2021 Peak Hour Traffic
- Figure 3 Future 2026 Background Peak Hour Traffic
- Figure 4 Development Peak Hour Traffic
- Figure 5 Existing 2021 + Development Peak Hour Traffic
- Figure 6 Future 2026 Background + Development Peak Hour Traffic

Tables

- Table 1 Extent of the Proposed Development
- Table 2 Heavy vehicle trip generation estimation
- Table 3 Light vehicle trip generation estimation
- Table 4 Tabled values of the relationship between queue length, number of lanes and utilization factor (Qm)
- Table 5 Results of Sidra Analyses (R547 & R544)
- Table 6 Results of Sidra Analyses (R544 & D1947 North)
- Table 7 Results of Sidra Analyses (R544 & D1947 South)

Drawings

- Drawing no: 21047/AL/01 Proposed Access Upgrades and Existing Parking Area
- 21047/ID/01 Proposed Intersection Upgrades

Annexures

- Annexure A SIDRA Capacity Analysis Results
- Annexure B Proposed Mining Infrastructure Layout
- Annexure C Risk Assessment

1 Introduction

EDL Engineers (Pty) Ltd was appointed to conduct a Traffic Impact Assessment for the proposed expansion of the existing Dorstfontein East Coal Mine (DECM), east of Kriel within the Emalahleni Local Municipality jurisdiction boundaries, in Mpumalanga.

The purpose of this traffic impact assessment report is to investigate the expected additional peak hour traffic generated by the proposed expansion of the existing Dorstfontein East colliery and to quantify and evaluate its impact on the existing road network near and surrounding the study area.

As part of the study, it is customary to also evaluate the NMT (Non-Motorised Transport) and Public Transport facilities for a development and to propose new facilities if the demand for Public Transport is higher than what is currently available on or near a development site.

As can be seen in the chapters that follow, we have undertaken peak period traffic counts at the key intersections, identified according to the TMH16, and analysed these key intersections by using SIDRA™ Intersection Analyses, which we have performed in the critical peak hours for various traffic scenarios, including the future 5-year horizon, using a compound annual growth rate, to check for overall possible capacity restraints. We have also checked for required upgrades at these relevant key intersections.

Based on Sidra™ analyses results, intersection and road upgrades are usually proposed, for certain road conditions (potholes, edge brake etc.), or if congested Levels of Service (L.O.S.) and Average Delays are found at the relevant key intersections.

Trip generation for the expansion of the mining development is calculated from the trip rates and vehicle splits as set out in TMH17 Table 3.3 and based on additional coal outputs as well as peak hour traffic generated by additional staff.

Printouts of the Sidra™ analyses results of the key intersections are included in **Annexure A** at the back of the report, with a summary of the analyses output in **Tables 5-7**.

1.1 Abbreviations

MDPWRT	Mpumalanga Department of Public Works, Roads and Transport	P.T.	Public Transport
COTO	South Africa Committee of Transport Officials	vph	Vehicles per hour
T.I.A.	Traffic Impact Assessment	q	Lane Utilisation Factor
HV	Heavy Vehicles	Qm	Access Utilisation Factor
LV	Light Vehicles	L.O.S.	Level of Service
N.M.T.	Non-motorised Transport	B.S.D.	Barrier Sight Distance
CATG.	Compound Annual Traffic Growth	SSD	Stopping Sight Distance
		AM/PM	Morning Peak Hour / Afternoon Peak Hour
		ROW	Right of Way

2 Site Location

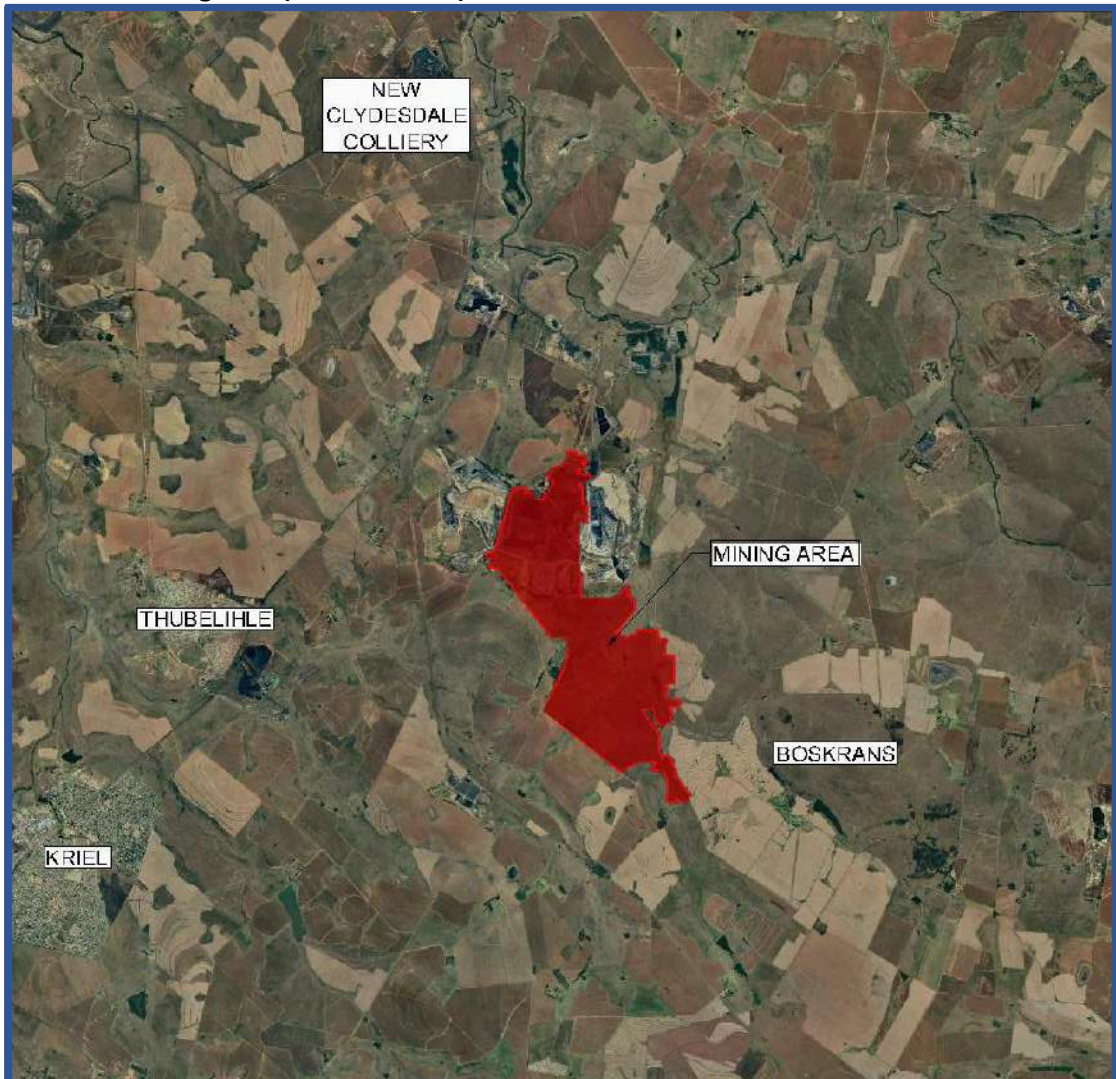
2.1 Site Location

As shown in **Figure 1**, the Dorstfontein Colliery is situated just east of Thubelile and Kriel, and north-west of Boskrans. The extent of the mining right boundaries is as follows:

- Ptn 12 Bosch Krans 53 IS
- Ptn 8 Dorstfontein 71 IS
- Ptn 2 Dorstfontein 71 IS
- Ptn 2 Fentonia 54 IS
- Ptn 3 Fentonia 54 IS
- Ptn 1 Fentonia 54 IS
- Rietkuil 57 IS
- Welstand 55 IS
- Ptn 4 Welstand 55 IS
- Ptn 10 Welstand 55 IS
- Ptn 11 Welstand 55 IS
- Ptn 13 Welstand 55 IS
- Ptn 5 Welstand 55 IS

Access is currently taken from District Road D1947, about 3.5km south-east of its intersection with the R544 at coordinates 26°11'10.70"S and 29°21'42.67"E.

Site Location - Figure 1 (Also attached)



3 Surrounding Road Network and Traffic Flow

3.1 Surrounding Road Network

The following roads are relevant to the study area:

R547: This road functions as a Regional Distributor (Class 2) and continues, west and north of its 4-way stop intersection with the R544. It runs about 2km north-west of the existing mining area, in a north-east / south-west direction to and from Kriel, turning north at the mentioned intersection, to Emalahleni, with an observed speed limit of 60km/h near the study site. This road is a single carriageway road with no median and one lane in each direction. Manually undertaken traffic counts indicate that this road carries traffic volumes of between 145vph and 255vph per direction during the weekday morning (AM) and afternoon (PM) peak hours.

R544: This road functions as a Regional Distributor (Class 2) and continues south and east of its intersection with the R547, about 2km north-west of the study site. This road has an observed speed limit of 80km/h, in the vicinity of the intersection of the R544 and D1947. This road is in a poor condition near this mentioned intersection. This is a surfaced single carriageway road with one lane per direction near the study site. Manually undertaken traffic counts indicate that the north-eastern leg of this road carries traffic volumes of between 100vph and 185vph per direction during the weekday morning (AM) and afternoon (PM) peak hours. The south-eastern leg of this road is a lot less busy with volumes of lower than 35vph during the mentioned peak hour periods.

D1947: This road, which is classified as a District Collector (Class 4) and falls under the jurisdiction of the Mpumalanga Department of Public Works, Roads and Transport (MDPWRT), provides access to several mining developments along its length. This is a gravel road, predominantly, with space for one vehicle travelling per direction, running in a north-west / south-east direction between the R544 north and R544 south. This road intersects the R544 to the north and south by means of T-junction intersections with the R544 having the Right of Way. The northern intersection with the R544 is in a poor condition and upgrades are proposed within Chapter 8. Manually undertaken traffic counts indicate that this road carries traffic volumes of between 10vph and 80vph per direction during the weekday morning (AM) and afternoon (PM) peak hours.

3.2 Future Road Network

According to the information available to EDL Engineers (Pty) Ltd, there are no new roads / streets planned within the immediate vicinity of the colliery which might impact the expansion of the colliery, nor its operations. For any other possible upgrades, please refer to Chapter 5, or Chapter 8.

3.3 Existing Traffic Flows

As a result of the existing surrounding roads, and coal mine, as well as the number of vehicles trips the expanded operations is expected to generate per hour, during weekdays, the study area was defined to include three (3) key intersections, which were analysed using SIDRA 9™.

Weekday Morning and Weekday Afternoon Traffic Counts were therefore carried out during the Weekday Morning (AM) and Weekday Afternoon (PM) commuter peak periods, in August of 2021, at the following identified intersections:

Key Intersections: R547 & R544
 R544 & D1947 north
 R544 & D1947 south

The existing Weekday Morning (AM) and Weekday Afternoon (PM) peak hour traffic volumes at the above-mentioned key intersections are summarised in **Figure 2**.

Note on COVID-19: Please note that the traffic counts were done, during normal peak hour traffic conditions on a weekday, within a period of relaxed lockdown restrictions (adjusted level 2), when all the schools were open, and therefore no adjustments to the traffic volumes were deemed necessary.

4 Proposed Development & Trip Generation

With reference to **Drawing No. 21047/AL/01**, the following sub-chapters are relevant with respect to the expansion of the existing colliery.

4.1 Proposed Development Expansion

It is currently proposed to extend the existing approved underground mining area and to also introduce supporting infrastructure to achieve the abovementioned expansion thereof. ECC aims to extend the underground mining area of Seam 2 and Seam 4, associated with the Mining Right.

New infrastructure proposed as part of the expansion include the following:

- ▣ Portal ventilation fan;
- ▣ Sewage Treatment Plant;
- ▣ Water Treatment Plant;
- ▣ Potable Water storage tank;
- ▣ Erikson Pond;
- ▣ A new 22 kV overhead powerline from the existing substation to a new 22kV substation;
- ▣ Run of Mine (ROM) Stockpile conveyor at portal;
- ▣ Change house;
- ▣ Lamp room;
- ▣ Office;
- ▣ Clinic;
- ▣ Stores;
- ▣ Workshop area;
- ▣ Stone dust silo; and
- ▣ Coal discard processing plant.

The additional RPM coal is estimated at about 100 kilotons per month. An additional 20% is added to account for unforeseen changes in the amount of haulage trucks per hour, as follows:

Table 1: Extent of the Proposed Expansion

Proposed Use	Estimated Output	Traffic / Hr (one-way)
Mining	120 000 tons / month	10 trucks / Hr (32t payload)
Total	120 000 tons / month	20 trucks / Hr both directions 10 trucks / Hr (one-way)

4.2 Trip Generation

The expected trip generation for the proposed expansion is discussed below:

Coal Output (Heavy Vehicles): The breakdown for the Heavy Vehicles is calculated in accordance with an estimated (worst case) additional coal output of 120,000 tons / month, as explained above, using a 30-day working month and 32-ton payload capacity as per **Table 2** on the next page.

Personnel (Light Vehicles): For the employees, whom is a combination of office bound engineering and admin staff as well as site and operational staff, a trip rate of 0.5vph was deemed appropriate per employee. The max. no of employees, including site staff and contractor staff is estimated at an additional total of about 220 people, as per information available.

Using a trip rate of 0.5vph, a total of 110vph was calculated during the AM and PM peak hours. This is a worst case that allow for the vehicles travelling only within the weekday peak hours and not before and after the relevant peak hours. The details are provided in **Table 3**.

Table 2: Heavy vehicle trip generation estimation (worst case)

Coal Output	Trips/day	Adj. Factor	Split %	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Estimated (Max) Coal Output of 120,000 t/month	125 trucks / day	-	50/50 50/50	10	10	20	10	10	20
Total Trips				10	10	20	10	10	20

Table 3: Light vehicle trip generation estimation

Employees	Trip rate/hr	Adj. Factor	Split %	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Estimated at 220	0,5vph / employee	-	75/25 25/75	82	28	110	28	82	110
Total Trips				82	28	110	28	82	110

The total additional peak hour trips are therefore estimated at **130vph** in the weekday peak hours.

Figure 4 shows the estimated trip generation and distribution for the proposed expansion of the existing Dorstfontein East Coal Mine.

4.3 Latent Rights

According to information available, there is no nearby latent rights developments which shares the key intersections as deemed relevant in this study and we have also allowed for background traffic growth over a 5-year horizon period.

Please refer to **Figure 6** for the total impact on the key intersections, in the future, which thereby considers any future development.

5 Queueing Analysis & Site Access

5.1 Queueing Analysis

The formula used for an exceedance of 95% is as follows:

$$\frac{\ln(0.05) - \ln(Q_m)}{\ln(q)} - 1$$

Where:

Utilization factor (q):

$$\frac{\text{Arrival rate}}{(\text{Number of lanes}) * (\text{Service rate per lane})}$$

And by means of interpolation, Q_m is determined by using **Table 4** below:

Table 4: Tabled values of the relationship between queue length, number of lanes and utilization factor (Q_m)*

Table of Q _m Values							
LANES	1	2	3	4	6	8	10
0,0	0,0000	0,0000	0,0000	0,0000			
0,1	0,1000	0,0182	0,0037	0,0008	0,0000	0,0000	0,0000
0,2	0,2000	0,0666	0,0247	0,0096	0,0015	0,0002	0,0000
0,3	0,3000	0,1385	0,0700	0,0370	0,0111	0,0036	0,0011
0,4	0,4000	0,2286	0,1411	0,0907	0,0400	0,0185	0,0088
0,5	0,5000	0,3333	0,2368	0,1739	0,0991	0,0591	0,0360
0,6	0,6000	0,4501	0,3548	0,2870	0,1965	0,1395	0,1013
0,7	0,7000	0,5766	0,4923	0,4286	0,3359	0,2706	0,2218
0,8	0,8000	0,7111	0,6472	0,5964	0,5178	0,4576	0,4093
0,9	0,9000	0,8526	0,8172	0,7878	0,7401	0,7014	0,6687
1	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000	1,0000

*Source: Transportation and Land Development (Vergil G Stover / Frank J Koepke)

Calculations on the expected queue length were based on a maximum arrival rate ("IN" only) of 82vph (light vehicles) and 10vph (heavy vehicles), in the worst peak hour for entering vehicles (Weekday AM) at the access.

In a worst-case scenario with a 150vph service rate for light vehicles and a 30vph service rate for haulage trucks (heavy vehicles) at the security gate of the Colliery, with a worst case of only two (2) entrance lanes (only one for light vehicles and only one for heavy vehicles), the utilization factor (q) equates to 0.547 and 0.333 for light and heavy vehicles, respectively. By then using **Table 4** above, Q_m can be determined as 0.547 and 0.333 for each case. By solving for the exceedance of 95%, the queue length equates to three (3) additional light and one (1) additional heavy vehicle, respectively, plus two (2) vehicles at each category to account for additional random arrivals. This means the additional space required for vehicles queuing from the road edge of District Road D1947 towards the entrance gate is the longer distance of the two above-calculated stacking spaces, being 75m of additional required stacking space (25m x 3 heavy vehicles). Considering that the access operates successfully at the moment, with a hard park area, in place, much more than the required space is available to accommodate the additional estimated queue in front of the access gate.

5.2 Site Access

The colliery is currently accessed by means of one (1) access point:

D1947 Site Access:

A 'Full' access from the D1947, approximately 3.5km south-east of the intersection of the R544 and D1947, with several entrance lanes (light vehicles and trucks separate) and one exit lane, all measuring a combined 40m in width at the gate. The gate is about 150m away from the road edge of the D1947, with a hard park area to account for queueing of haulage trucks.

The access operates successfully with 4 lanes 'IN' (two for trucks and two for light vehicles) and 1 large lane 'OUT', with more than enough queueing distance, even for the additional number of vehicles expected to queue at this access following the expansions as proposed. For the required queueing / stacking at this access, please refer to the Queueing analysis done in the previous sub-chapter.

The access radii are proposed to be a minimum of 25m where the haulage trucks are expected to turn, i.e., at the exit lane for trucks heading north-west, and for the entrance, before reaching the hard park area. This radius must be maintained on site to keep haulage trucks from turning too sharply causing the trailer to run over unscathed land.

A dust suppression layer is proposed to be implemented on the D1947 (for at least 100m to the north and 300m to the south), past its intersection with the access road toward the colliery, respectively. Please refer to **Drawing No. 21047/AL/01** for the access layout with minor upgrades. This **dust suppression layer must be maintained** regularly to keep the dust from the heavy vehicles to a minimum.

The turning circles of a WB-20 Double Bottom Interlink Truck was tracked through the access road and relevant intersection with District Road D1947, as also shown on **Drawing No. 21047/AL/01**, to ensure that trucks will be able to manoeuvre onto and from the access intersection to the site.

5.3 Sight Distance at the Access (SSD)

SSD (Stopping Sight Distance) is calculated as follows:

$$SSD = \frac{v^2}{254(f \pm G)} + 0.694v$$

As can be seen on **Drawing No. 21047/AL/01** the access road is situated on a relatively flat section of the D1947, with an average slope of less than $\pm 3\%$, and a slight (large radius) left hand bend in its alignment to the south. By using the equation above, with a speed limit (v) of 60km/h, a break force coefficient (f) of 0.4 (gravel road) and an average gradient of $\pm 3\%$, the stopping sight distance calculates to $\pm 80m$, which is available to either side of where the access is situated on District Road D1947, and therefore acceptable from a SSD point of view.

5.4 Shoulder Sight Distance

For a road with an expected speed limit of 60km/h, a total of 170m of barrier sight distance must be available to either side of where an access is proposed, according to the Guidelines for Human Settlement Planning and Design, Chapter 7 (Roads: Geometric design and layout planning) Table 7.7. It can be concluded that more than the required shoulder sight distance is available on site, to the north and south of where the access is on District Road D1947.

5.5 Access Safety

- A maximum Speed limit of 60km/h, if not already enforced, must be enforced, and the proposed speed limit signs are to be erected at the start of District Road D1947, at its intersection with the R544, and near the access road intersection within 200m of the access road. Refer to **Drawing No. 21047/AL/01** and **Drawing No. 21047/ID/01**.
- U-turn space, if not already provided, (of at least 30m x 60m) will need to be provided on the site to avoid dangerous vehicle manoeuvres on the access road or District Road D1947.

6 Traffic Flows and Distribution

It is required to determine the Future 5-year Horizon traffic by applying a compound annual growth rate (CAGR) to the existing traffic. As the greater area around the site has potential for new mines or the expansions thereof, and subsequently more housing developments, the background traffic growth is expected to be positive. With information available to EDL Engineers, it can be concluded that the greater area, which includes Kriel to the west, have seen an average population growth of about 2.9%. Therefore, a traffic growth rate (CATG) of **3.0% per annum** was adopted and applied to the existing 2021 peak hour traffic counts for this study.

Figure 5 shows the existing 2021 peak hour traffic plus estimated development traffic, which is the summation of **Figures 2** and **Figure 4**.

Figure 6 shows the future 2026 peak hour traffic plus estimated development traffic which is the summation of **Figures 3** and **Figure 4**.

6.1 Trip Distribution

Assumptions on the expected trip distribution were based on the location of the site's existing access in relation to the surrounding road network, as well as possible trip attractions within the greater area such as existing power stations and residential areas for employees. The traffic was therefore distributed as per the approximate percentages set out below:

From the exit road onto the D1947 (100% of traffic to be distributed):

- 80% of total generated traffic is estimated to turn left, heading north-west towards the intersection of the D1947 and the R544 north.
- 20% of total generated traffic is estimated to turn right, heading south-east towards the intersection of the D1947 and the R544 south.

R544 & D1947 north (80% of total generated traffic to be distributed):

- 64% of total generated traffic will be turning left, heading westbound towards the intersection of the R547 and R544.
- 16% of total generated traffic will be turning right, heading eastbound with the R544.

R544 & D1947 south (20% of total generated traffic to be distributed):

- 20% of total generated traffic is estimated to turn left, heading south-east with the R544.

R547 & R544 (64% of total generated traffic to be distributed):

- 60% of total generated traffic is estimated to continue straight on, heading westbound towards Kriel.
- 4% of total generated traffic is estimated to turn left, heading southbound with the R544.

7 Traffic Impact & Capacity Analyses

To determine the expected traffic impact of the proposed expansion of the existing colliery at the key intersections, capacity analyses were carried out by using SIDRA 9™, a well-known traffic engineering software package. The following intersections were analysed:

Key Intersections: R547 & R544
 R544 & D1947 north
 R544 & D1947 south

The following scenarios were analysed at the above-mentioned key intersections, namely:

- ▣ Existing 2021 Weekday Morning (AM) and Weekday Afternoon (PM) peak hour without the development traffic (as per **Figure 2**).
- ▣ Existing 2021 Weekday Morning (AM) and Weekday Afternoon (PM) peak hour with development traffic (as per **Figure 5**).
- ▣ Future 2026 Background Weekday Morning (AM) and Weekday Afternoon (PM) peak hour without development traffic (as per **Figure 3**).
- ▣ Future 2026 Background Weekday Morning (AM) and Weekday Afternoon (PM) peak hour with development traffic (as per **Figure 6**).

The next subsections illustrate the SIDRA 9™ results in three tables and briefly discusses the results and key conclusion at the analysed intersections, with the details of SIDRA 9™ Intersection Capacity Analyses appended in **Annexure A**.

7.1 R547 & R544

Also see **Annexures A1.1 to A1.8** as they have reference:

Table 5 – Results of Sidra Analyses (R547 & R544)

Intersection		1. R547 & R544			
Scenario		Existing 2021	Exist 2021 + Dev	Future 2026	Future 2026 + Dev
Level of Service	Weekday Morning AM Peak Hour	A	A	A	A
	Weekday Afternoon PM Peak Hour	A	A	A	A
Average Delays	Weekday Morning AM Peak Hour	6.7	7.4	7.2	7.9
	Weekday Afternoon PM Peak Hour	7.5	8.3	8.2	9.1
Remarks	The Intersection currently operates acceptably, with the development traffic added – no capacity upgrades are required.				

7.2 R544 & D1947 North

Also see Annexures A2.1 to A2.8 as they have reference:

Table 6 – Results of Sidra Analyses (R544 & D1947 North)

Intersection		2. R544 & D1947 North			
Scenario		Existing 2021	Exist 2021 + Dev	Future 2026	Future 2026 + Dev
Level of Service	Weekday Morning AM Peak Hour	A	A	A	B
	Weekday Afternoon PM Peak Hour	A	A	A	B
Average Delays	Weekday Morning AM Peak Hour	9.6	9.8	9.8	10.1
	Weekday Afternoon PM Peak Hour	9.5	9.8	9.6	10.0
Remarks	The Intersection currently operates acceptably, with the development traffic added – no upgrades are required for capacity purposes. However, this intersection is in a poor condition and therefore upgrades are proposed for this intersection, as per Chapter 8 and Drawing No. 21047/ID/01.				

7.3 R544 & D1947 South

Also see Annexures A3.1 to A3.8 as they have reference:

Table 7 – Results of Sidra Analyses (R544 & D1947 South)

Intersection		3. R544 & D1947 South			
Scenario		Existing 2021	Exist 2021 + Dev	Future 2026	Future 2026 + Dev
Level of Service	Weekday Morning AM Peak Hour	A	A	A	A
	Weekday Afternoon PM Peak Hour	A	A	A	A
Average Delays	Weekday Morning AM Peak Hour	5.9	5.9	6.0	6.0
	Weekday Afternoon PM Peak Hour	6.0	5.9	6.0	5.9
Remarks	The Intersection currently operates acceptably, with the development traffic added – no capacity upgrades are required.				

8 Road and / or Intersection Upgrades

8.1 Proposed Road Upgrades

As per **Tables 5 to 7** in Chapter 7, all the key intersections perform within acceptable levels of service and average delays, even with the increased number of heavy vehicles (coal haulage trucks) and light vehicles expected to travel on them, within the 5-year horizon period. As a result, no upgrades are required, for capacity purposes.

However, the intersection of the R544 and District Road D1947 was found to be in a poor condition, with several longitudinal cracks, which will lead to potholes within the foreseeable future, as well as a lack of visible road markings, extending for over 100m on all approaching legs of this intersection.

The entire intersection is therefore proposed to be resurfaced, extending for between 100m and 120m past the intersection midpoint, in all directions. The road markings of this intersection are thereafter proposed to be repainted before the additional mine activities can commence. Please refer to **Drawing No. 21047/ID/01**.

As mentioned earlier, it is proposed to implement dust suppression on the gravel road surface of the D1947, for at least 100m to the north and 300m to the south (on the D1947), to minimise dust as a result of vehicles traveling past the site's access. It is also proposed to keep the relevant 400m portion of District Road D1947 in front of the mine access, clean (from coal dust). This will ensure increased visibility and ultimately, road user safety in the vicinity of the access road intersection. Refer to enclosed **Drawing No. 21047/AL/01**.

9 Public Transport Assessment

9.1 Pedestrian Walkways & Crossings

There are no existing pedestrian walkways along the D1947. With no residential or retail area in the immediate vicinity, the addition of pedestrian walkways is not required, nor proposed.

9.2 Public Transport Facilities

In terms of the National Land Transport Transition Act (NLTTA) 22 of 2000, Section 29, it is a requirement that an assessment of the public transport issues be included in the traffic impact assessments. The Act also requires that there be public transport facilities within 1km walking distance from a development in a built-up area.

Given the location of the colliery site and its distance from any major settlement, no public transport facilities are present near the site. However, if not already present on site, it is proposed that the colliery provide a taxi / bus facility (large enough to allow for the turning circles of PT Vehicles and a minimum of 30m x 60m in size) within the colliery parking grounds to cater for the additional workers which might be using public transport to travel to-and-from work.

A formalised internal public transport drop-off and pick-up zone is therefore proposed for the coal mine development as stated above.

10 Conclusions & Recommendations

Based on the content of this traffic impact report, the following key conclusions and recommendations are relevant:

- The Traffic Impact Assessment was prepared for the proposed expansion of the existing Dorstfontein East Coal Mine, situated near Kriel, within the Emalahleni Local Municipality jurisdiction boundaries, in Mpumalanga.
- As shown in **Figure 1**, the proposed site is located approximately 8km east of Kriel, and between the R544 and District Road D1947.
- It is estimated that the additional operations of the colliery will generate (as a worst case) a total of 130vph trips (total 'In' plus 'Out') during the Weekday Morning (AM) and 130vph trips (total 'In' plus 'Out') during the Weekday Afternoon (PM) peak hours.
- SIDRA 9™ Intersection Capacity Analyses were carried out for the Weekday Morning and Weekday Afternoon peak periods at the key intersections and no upgrades for capacity purposes were found to be required for the development. However, other intersection upgrades as well as resurfacing is necessary as set out within **Chapter 8**.
- The intersection of the R544 and District Road D1947 (north) is to be resurfaced, for a minimum of between 100m and 120m in all directions and new road markings to be painted. Please refer to **Drawing No. 21047/ID/01**.
- Access is currently obtained via the D1947, with sufficient queueing / stacking space and sight distance.
- The access radii are proposed to be a minimum of 25m, and therefore it is proposed that the left side radius of the access be enlarged to accommodate the swept path of an interlink double bottom haulage truck.
- A 400m portion of the D1947 is proposed to be treated with a dust suppression layer, 100m to the north and 300m to the south, to minimise dust on this road which may impair sight distance.
- Regarding non-motorised and public transport, no pedestrian walkways, nor public transport lay-bys are proposed along the D1947, nor the access road. An internal public transport drop-off and pick-up zone must be made available on the premises of the colliery, with a minimum of 30m x 60m in size, as described in Chapter 9.

It is therefore recommended that the proposed expansion of the existing Dorstfontein East Coal Mine, near Kriel, in Mpumalanga, is supported from a traffic / transportation engineering perspective, provided that any upgrades be completed before the colliery commences with its additional operations, as set out / proposed in this report (and on **Drawings 21047/AL/01 & 21047/ID/01**) and to the relevant standards of the Mpumalanga Department of Public Works, Roads and Transport.

11 Bibliography

- ▣ TMH 17 - South African Trip Data Manual. (2013). South African Committee of Transport Officials.
- ▣ SIDRA Intersection 9. (2021). Australia: Department of Planning Transport and Infrastructure.
- ▣ TRH 26 - South African Road Classification and Access Management Manual. (2012). 1st ed. South African Committee of Transport Officials.
- ▣ TMH 16 - Traffic Impact and Site Traffic Assessment Manual. (2012). 1st ed. South African Committee of Transport Officials.
- ▣ South African Road Traffic Signs Manual (SARTSM) – Volume 2
- ▣ National Land Transport Transition Act (NLTTA) 22 of 2000, Section 29

Figures

Figure 1 Locality Plan

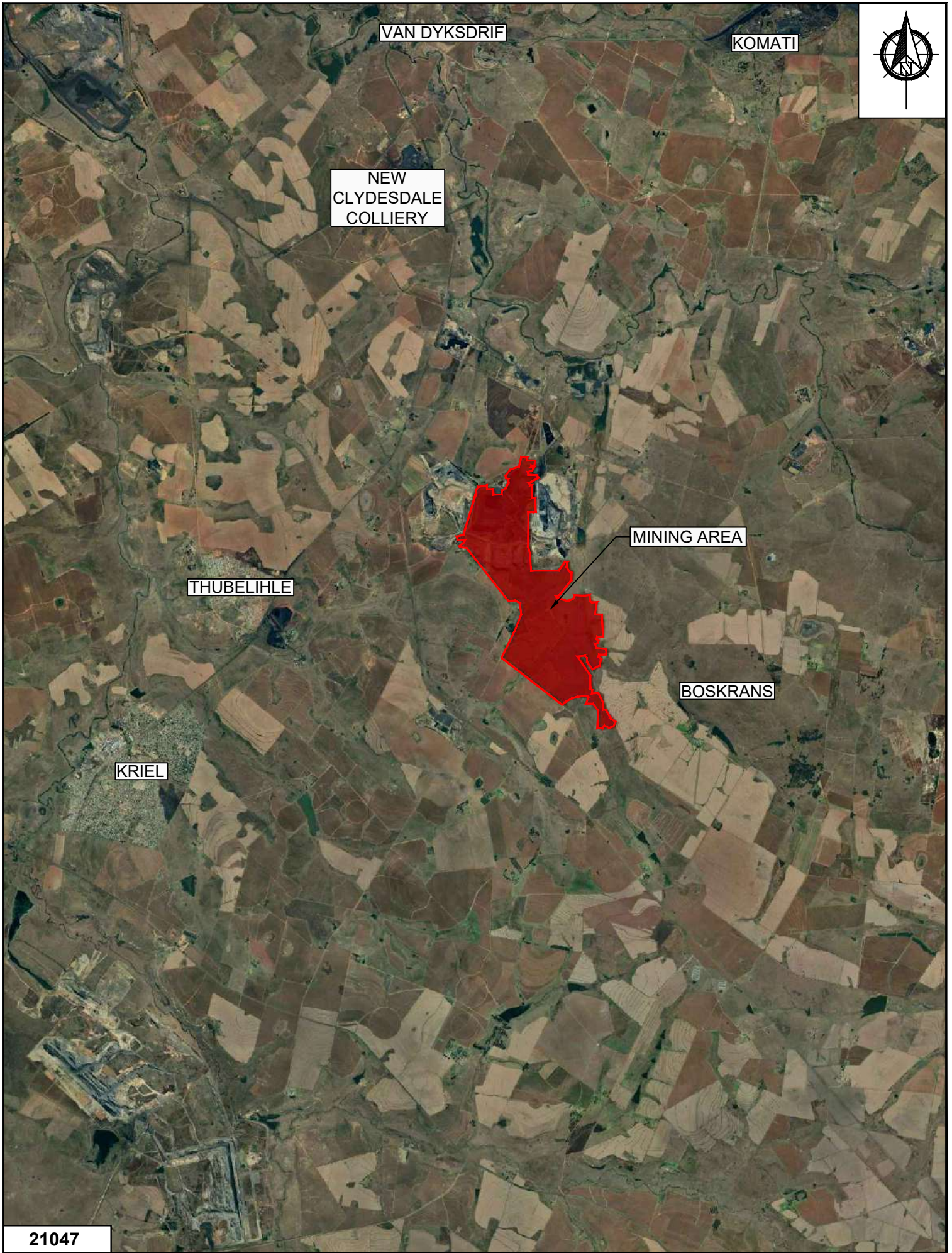
Figure 2 Existing 2021 Peak Hour Traffic

Figure 3 Future 2026 Background Peak Hour Traffic

Figure 4 Development Peak Hour Traffic

Figure 5 Existing 2021 + Development Peak Hour Traffic

Figure 6 Future 2026 Background + Development Peak Hour Traffic

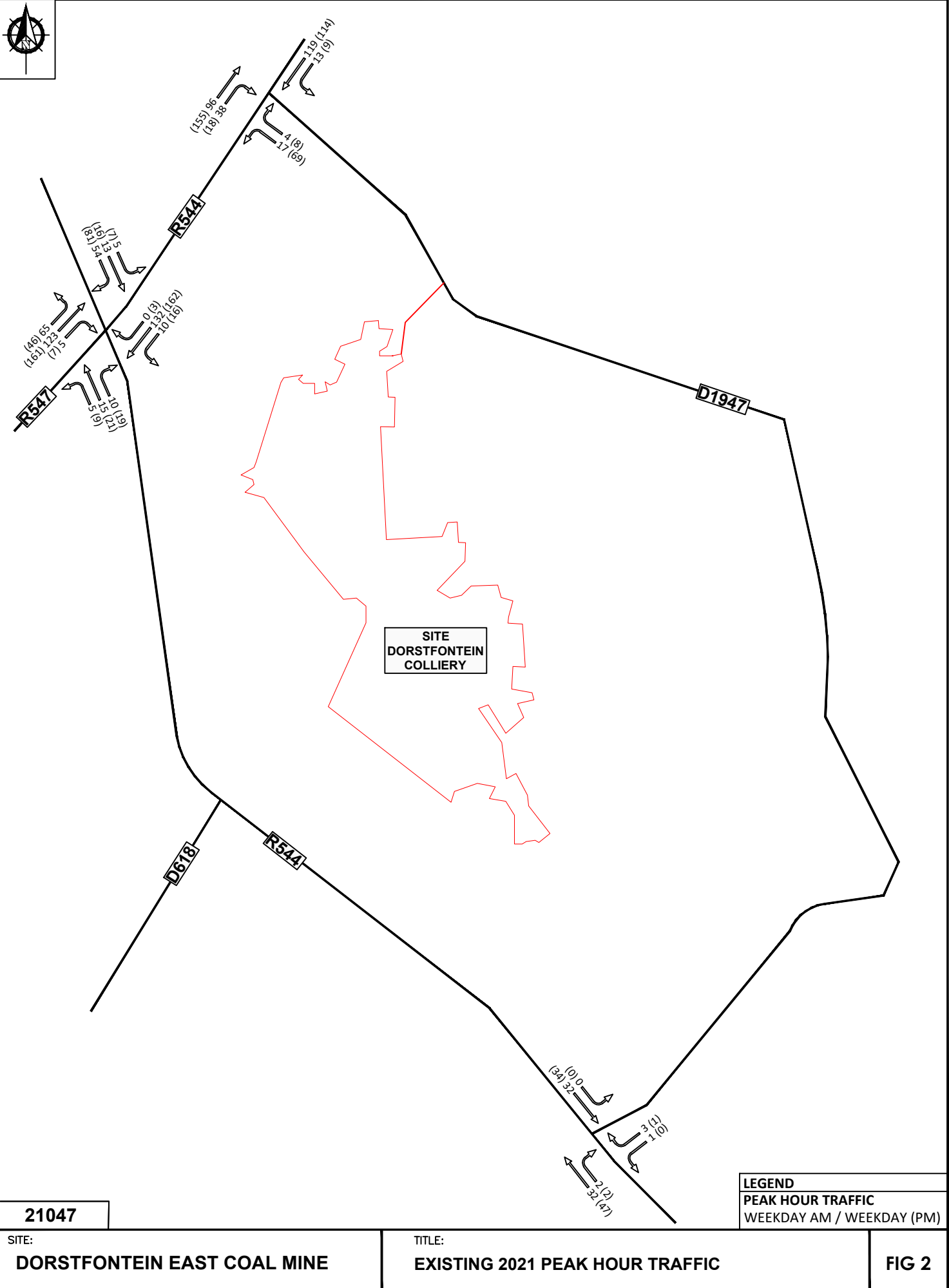


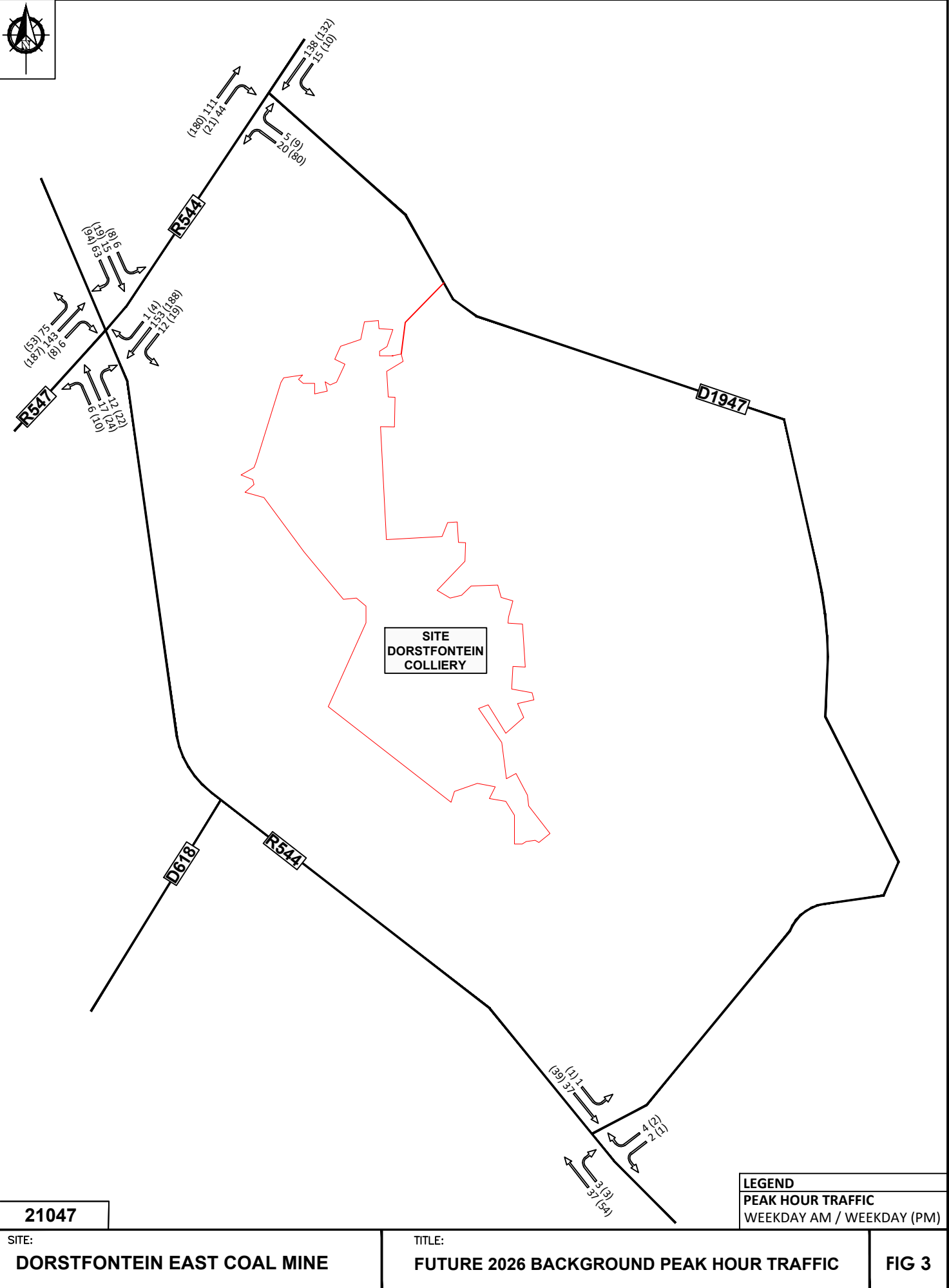
21047

SITE:
DORSTFONTEIN EAST COAL MINE

TITLE:
LOCALITY

FIG 1

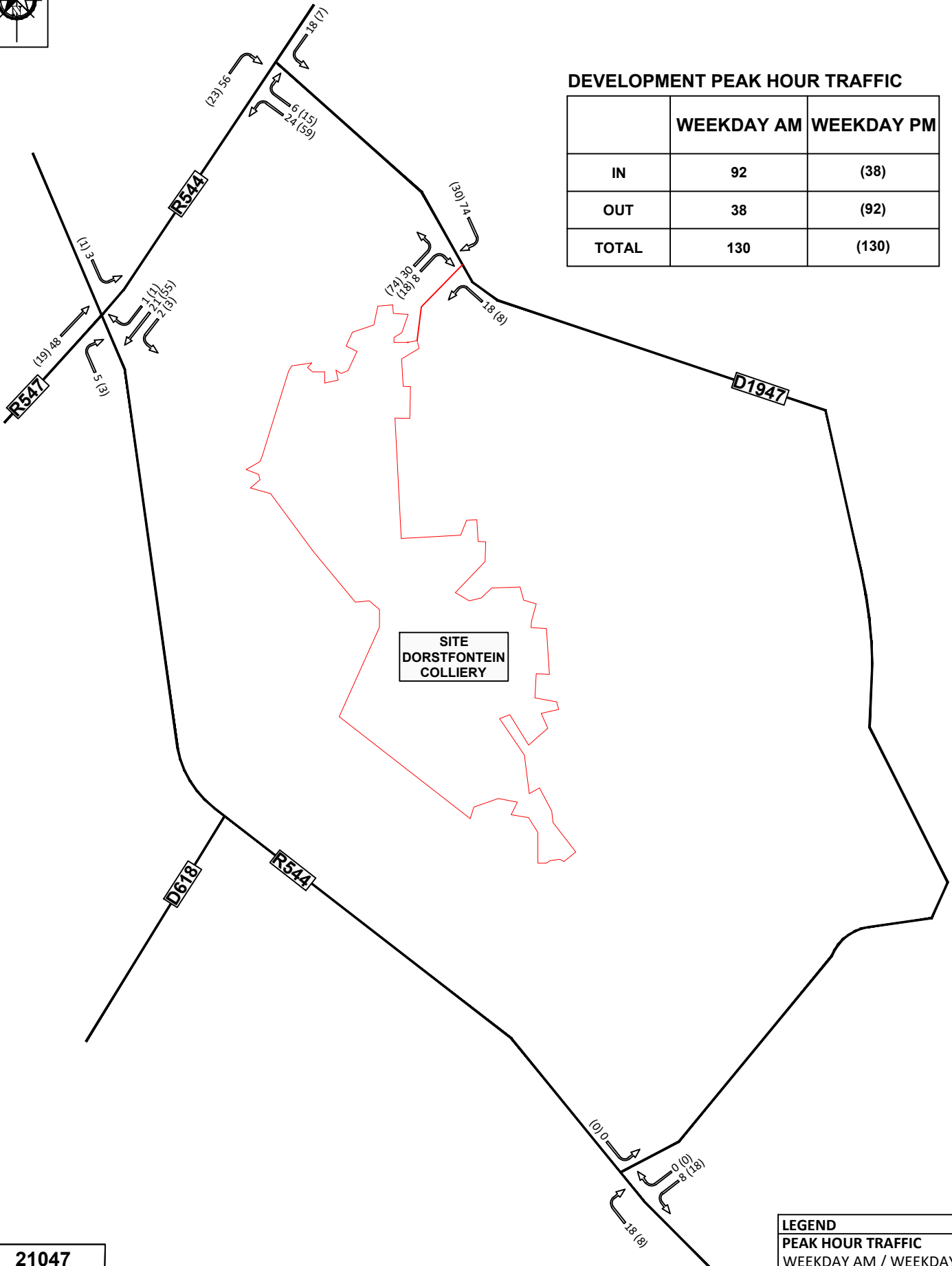






DEVELOPMENT PEAK HOUR TRAFFIC

	WEEKDAY AM	WEEKDAY PM
IN	92	(38)
OUT	38	(92)
TOTAL	130	(130)



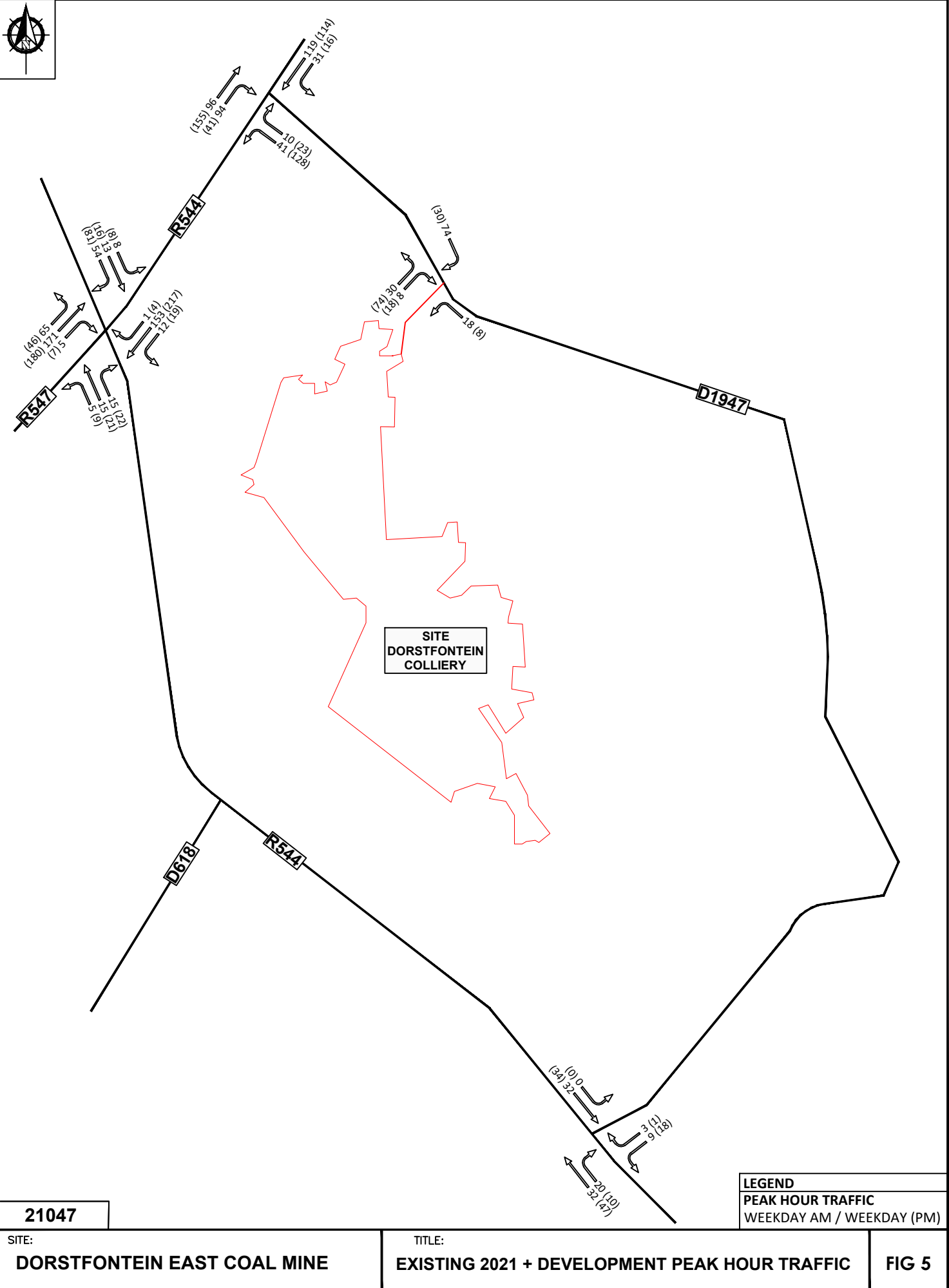
21047

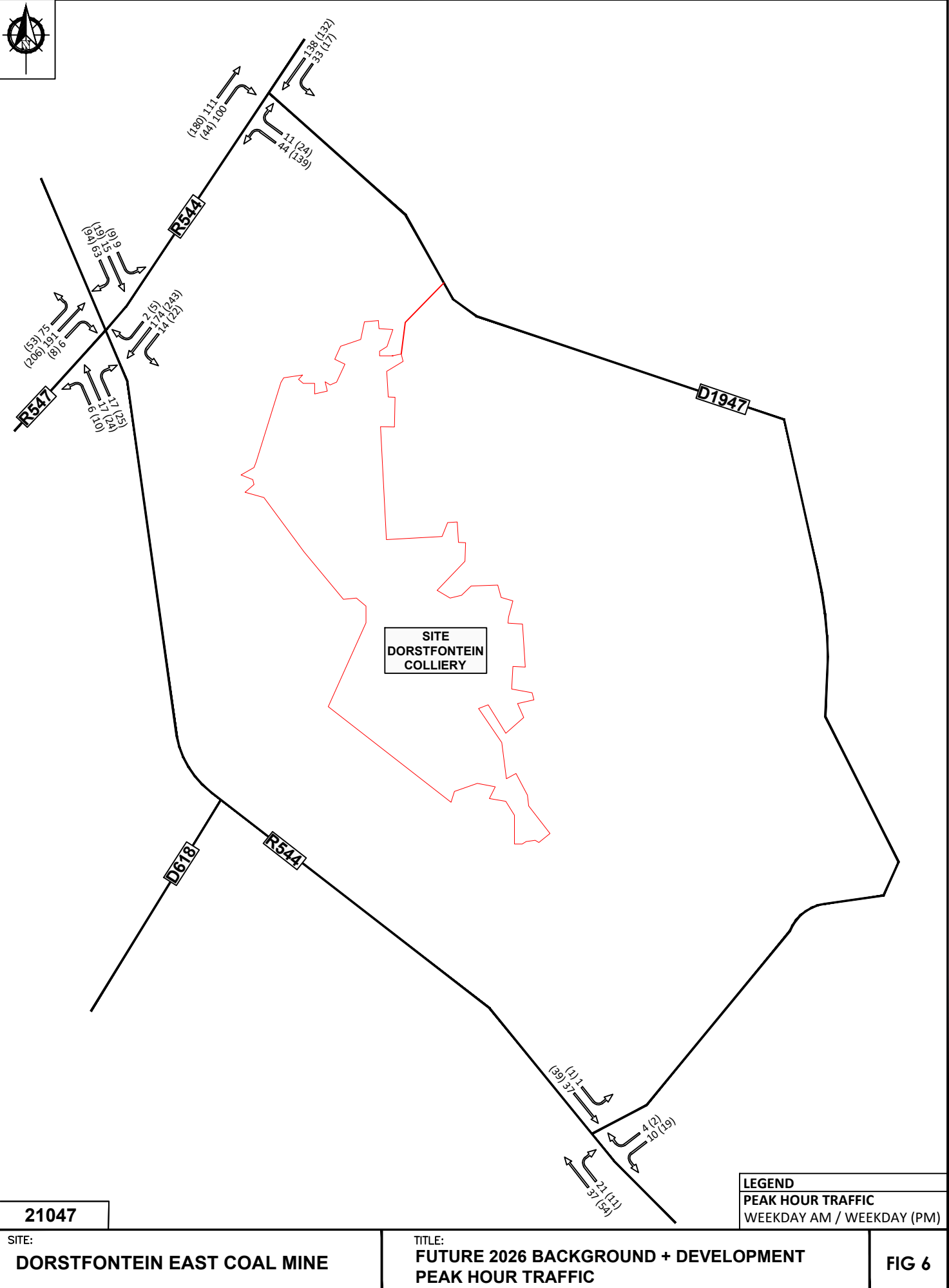
LEGEND
PEAK HOUR TRAFFIC
 WEEKDAY AM / WEEKDAY (PM)

SITE:
DORSTFONTEIN EAST COAL

TITLE:
DEVELOPMENT PEAK HOUR TRAFFIC

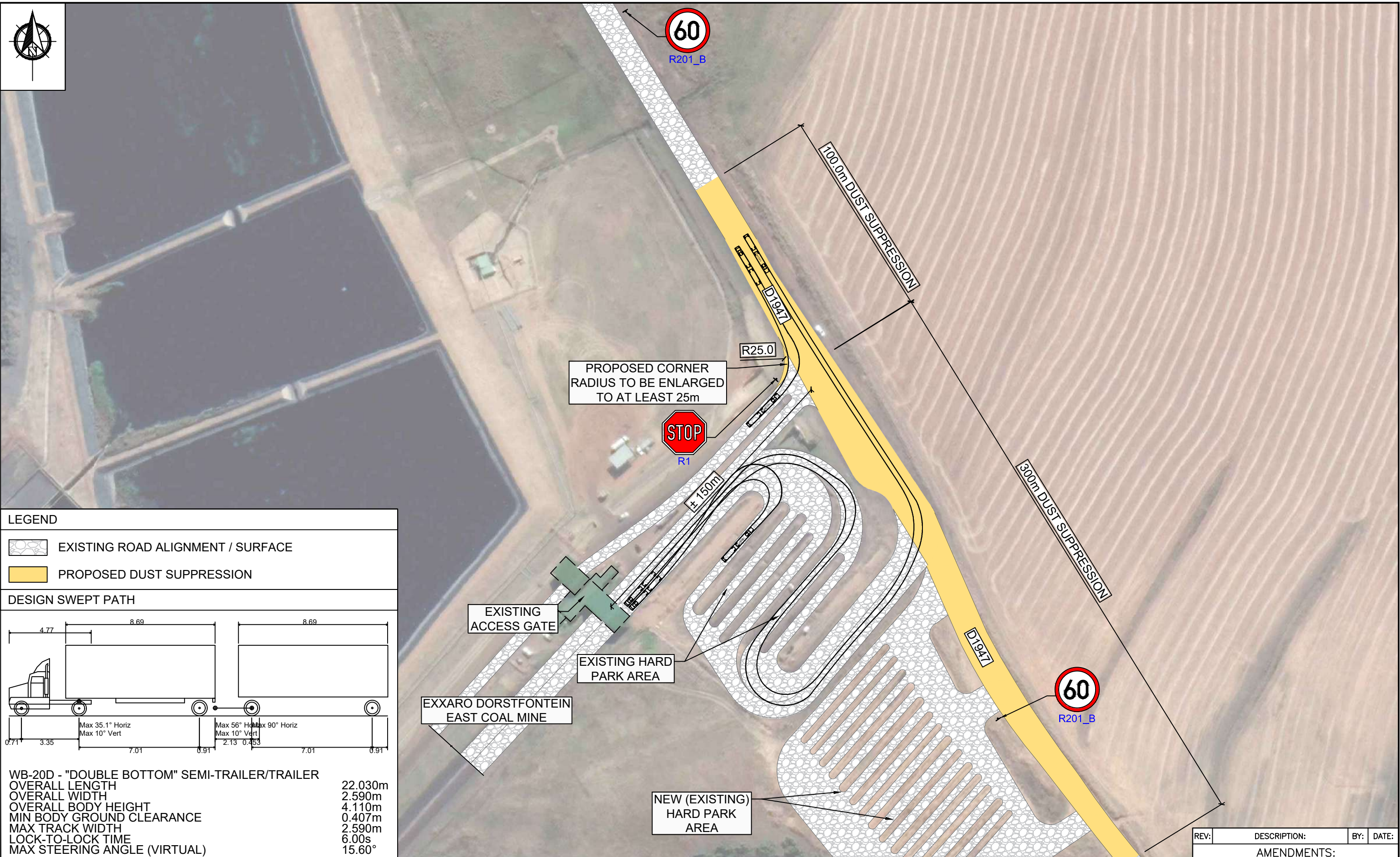
FIG 4





Drawings

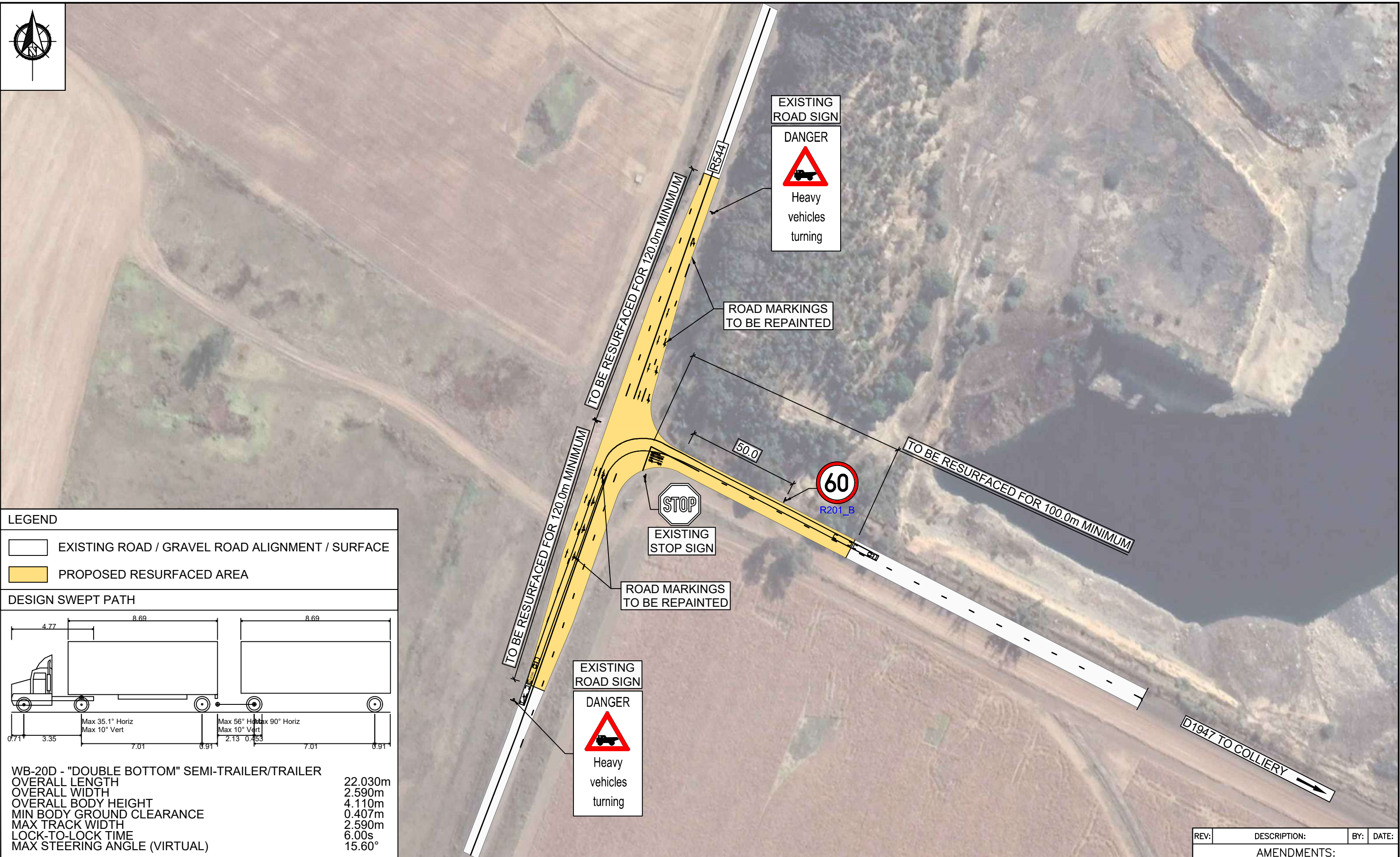
Drawing no: 21047/AL/01 Proposed Access Upgrades
 21047/ID/01 Proposed Intersection Upgrades



LEGEND	
	EXISTING ROAD ALIGNMENT / SURFACE
	PROPOSED DUST SUPPRESSION

DESIGN SWEEP PATH	
WB-20D - "DOUBLE BOTTOM" SEMI-TRAILER/TRAILER	22.030m
OVERALL LENGTH	2.590m
OVERALL WIDTH	4.110m
OVERALL BODY HEIGHT	0.407m
MIN BODY GROUND CLEARANCE	2.590m
MAX TRACK WIDTH	6.00s
LOCK-TO-LOCK TIME	15.60°
MAX STEERING ANGLE (VIRTUAL)	

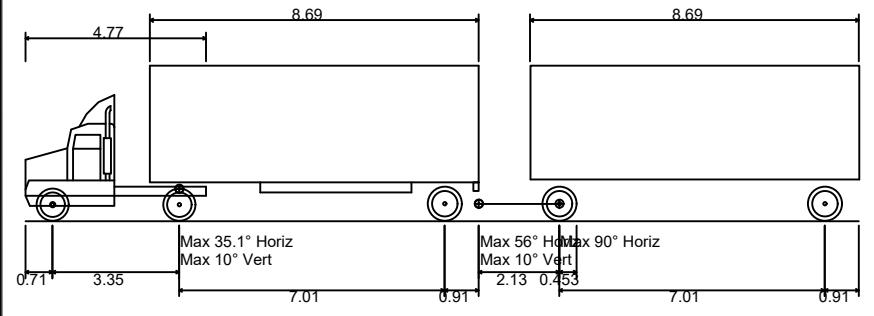
SITE: DORSTFONTEIN EAST COAL MINE	21047/AL/01	21047	SEPT. 21	EDL CONSULTING ENGINEERS 1st Floor, Block D The Village Office Park C/O Glenwood Rd & Oberon Ave, Fearie Glen, 0043 Tel: 087 897 5074/5/6 eben@edlengineers.co.za www.edlengineers.co.za
	DRAWING NO.	PROJECT NO.	DATE.	
TITLE: PROPOSED ACCESS UPGRADES AND EXISTING PARKING AREA	1:1500	HB SENEKAL	ED KOTZE	1
	SCALE AT A3.	DRAWN.	CHECKED.	REVISION.



LEGEND

- EXISTING ROAD / GRAVEL ROAD ALIGNMENT / SURFACE
- PROPOSED RESURFACED AREA

DESIGN SWEEP PATH



WB-20D - "DOUBLE BOTTOM" SEMI-TRAILER/TRAILER	
OVERALL LENGTH	22.030m
OVERALL WIDTH	2.590m
OVERALL BODY HEIGHT	4.110m
MIN BODY GROUND CLEARANCE	0.407m
MAX TRACK WIDTH	2.590m
LOCK-TO-LOCK TIME	6.00s
MAX STEERING ANGLE (VIRTUAL)	15.60°

SITE: **DORSTFONTEIN EAST COAL MINE**

TITLE: **PROPOSED INTERSECTION UPGRADES**

21047/ID/01
DRAWING NO.

21047
PROJECT NO.

SEPT. 21
DATE.

1:1500
SCALE AT A3.

HB SENEKAL
DRAWN.

ED KOTZE
CHECKED.

1
REVISION.

REV:	DESCRIPTION:	BY:	DATE:
AMENDMENTS:			

EDL CONSULTING ENGINEERS
 1st Floor, Block D
 The Village Office Park
 C/O Glenwood Rd & Oberon Ave,
 Fearie Glen, 0043
 Tel: 087 897 5074/5/6
 eben@edlengineers.co.za
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Annexure A

Relevant outputs of the SIDRA 9™ intersection capacity analyses at the key intersections

Annexure A1: R547 & R544

- ▣ A1.1 – Existing 2021 Weekday AM Peak Hour Traffic
- ▣ A1.2 – Existing 2021 Weekday PM Peak Hour Traffic
- ▣ A1.3 – Existing 2021 Plus Development Weekday AM Peak Hour Traffic
- ▣ A1.4 – Existing 2021 Plus Development Weekday PM Peak Hour Traffic
- ▣ A1.5 – Future 2026 Background Weekday AM Peak Hour Traffic
- ▣ A1.6 – Future 2026 Background Weekday PM Peak Hour Traffic
- ▣ A1.7 – Future 2026 Background Plus Development Weekday AM Peak Hour Traffic
- ▣ A1.8 – Future 2026 Background Plus Weekday PM Peak Hour Traffic

Annexure A1.1

Sidra Output: R547 & R544

Existing 2021 Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%				v/c	sec				
South: R544														
1b	L3	5	20.0	5	20.0	0.004	7.7	LOS A	0.0	0.1	0.30	0.54	0.30	52.2
2	T1	15	20.0	16	20.0	0.030	5.1	LOS A	0.1	0.8	0.29	0.54	0.29	53.1
3a	R1	10	20.0	11	20.0	0.030	6.6	LOS A	0.1	0.8	0.29	0.54	0.29	53.5
Approach		30	20.0	32	20.0	0.030	6.0	LOS A	0.1	0.8	0.29	0.54	0.29	53.1
NorthEast: R544														
24a	L1	10	20.0	11	20.0	0.007	5.3	LOS A	0.0	0.2	0.06	0.55	0.06	52.7
25	T1	132	20.0	139	20.0	0.118	4.4	LOS A	0.5	3.8	0.07	0.51	0.07	53.9
26b	R3	1	20.0	1	20.0	0.118	8.7	LOS A	0.5	3.8	0.07	0.51	0.07	53.2
Approach		143	20.0	151	20.0	0.118	4.5	LOS A	0.5	3.8	0.07	0.51	0.07	53.8
North: R547														
7b	L3	5	20.0	5	20.0	0.004	7.4	LOS A	0.0	0.1	0.25	0.53	0.25	52.4
8	T1	13	20.0	14	20.0	0.097	5.2	LOS A	0.3	2.7	0.39	0.61	0.39	52.3
9a	R1	54	20.0	57	20.0	0.097	7.0	LOS A	0.3	2.7	0.39	0.61	0.39	52.7
Approach		72	20.0	76	20.0	0.097	6.7	LOS A	0.3	2.7	0.38	0.61	0.38	52.6
SouthWest: R547														
30a	L1	65	20.0	68	20.0	0.047	5.3	LOS A	0.2	1.6	0.07	0.55	0.07	52.6
31	T1	123	20.0	129	20.0	0.115	4.4	LOS A	0.4	3.6	0.08	0.52	0.08	53.8
32b	R3	5	20.0	5	20.0	0.115	7.8	LOS A	0.4	3.6	0.08	0.52	0.08	53.2
Approach		193	20.0	203	20.0	0.115	4.8	LOS A	0.4	3.6	0.07	0.53	0.07	53.4
All Vehicles		438	20.0	461	20.0	0.118	5.1	NA	0.5	3.8	0.14	0.54	0.14	53.4

Annexure A1.2

Sidra Output: R547 & R544

Existing 2021 Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
1b	L3	9	20.0	9	20.0	0.008	8.0	LOS A	0.0	0.3	0.36	0.56	0.36	52.1
2	T1	21	20.0	22	20.0	0.054	5.3	LOS A	0.2	1.5	0.35	0.58	0.35	52.6
3a	R1	19	20.0	20	20.0	0.054	7.4	LOS A	0.2	1.5	0.35	0.58	0.35	53.0
Approach		49	20.0	52	20.0	0.054	6.6	LOS A	0.2	1.5	0.35	0.58	0.35	52.7
NorthEast: R544														
24a	L1	16	20.0	17	20.0	0.012	5.3	LOS A	0.0	0.4	0.07	0.55	0.07	52.6
25	T1	162	20.0	171	20.0	0.149	4.5	LOS A	0.6	4.9	0.08	0.51	0.08	53.9
26b	R3	3	20.0	3	20.0	0.149	9.4	LOS A	0.6	4.9	0.08	0.51	0.08	53.2
Approach		181	20.0	191	20.0	0.149	4.6	LOS A	0.6	4.9	0.08	0.52	0.08	53.7
North: R547														
7b	L3	7	20.0	7	20.0	0.006	7.6	LOS A	0.0	0.2	0.30	0.54	0.30	52.3
8	T1	16	20.0	17	20.0	0.155	5.5	LOS A	0.5	4.5	0.45	0.68	0.45	51.7
9a	R1	81	20.0	85	20.0	0.155	7.9	LOS A	0.5	4.5	0.45	0.68	0.45	52.1
Approach		104	20.0	109	20.0	0.155	7.5	LOS A	0.5	4.5	0.44	0.67	0.44	52.0
SouthWest: R547														
30a	L1	46	20.0	48	20.0	0.033	5.3	LOS A	0.1	1.1	0.09	0.55	0.09	52.6
31	T1	161	20.0	169	20.0	0.154	4.5	LOS A	0.6	5.0	0.10	0.52	0.10	53.8
32b	R3	7	20.0	7	20.0	0.154	8.5	LOS A	0.6	5.0	0.10	0.52	0.10	53.1
Approach		214	20.0	225	20.0	0.154	4.8	LOS A	0.6	5.0	0.10	0.52	0.10	53.5
All Vehicles		548	20.0	577	20.0	0.155	5.4	NA	0.6	5.0	0.18	0.55	0.18	53.2

Annexure A1.3

Sidra Output: R547 & R544

Existing 2021 + Development Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
1b	L3	5	20.0	5	20.0	0.004	7.8	LOS A	0.0	0.1	0.32	0.54	0.32	52.2
2	T1	15	20.0	16	20.0	0.040	5.2	LOS A	0.1	1.1	0.34	0.57	0.34	52.7
3a	R1	15	20.0	16	20.0	0.040	7.3	LOS A	0.1	1.1	0.34	0.57	0.34	53.0
Approach		35	20.0	37	20.0	0.040	6.4	LOS A	0.1	1.1	0.34	0.57	0.34	52.8
NorthEast: R544														
24a	L1	12	20.0	13	20.0	0.009	5.3	LOS A	0.0	0.3	0.06	0.55	0.06	52.7
25	T1	153	20.0	161	20.0	0.137	4.4	LOS A	0.5	4.4	0.08	0.51	0.08	53.9
26b	R3	1	20.0	1	20.0	0.137	9.3	LOS A	0.5	4.4	0.08	0.51	0.08	53.2
Approach		166	20.0	175	20.0	0.137	4.5	LOS A	0.5	4.4	0.08	0.51	0.08	53.8
North: R547														
7b	L3	8	20.0	8	20.0	0.007	7.7	LOS A	0.0	0.2	0.30	0.54	0.30	52.2
8	T1	13	20.0	14	20.0	0.107	5.5	LOS A	0.4	3.0	0.44	0.66	0.44	51.8
9a	R1	54	20.0	57	20.0	0.107	7.8	LOS A	0.4	3.0	0.44	0.66	0.44	52.2
Approach		75	20.0	79	20.0	0.107	7.4	LOS A	0.4	3.0	0.42	0.65	0.42	52.1
SouthWest: R547														
30a	L1	65	20.0	68	20.0	0.047	5.3	LOS A	0.2	1.6	0.07	0.55	0.07	52.6
31	T1	171	20.0	180	20.0	0.158	4.4	LOS A	0.6	5.2	0.08	0.51	0.08	53.9
32b	R3	5	20.0	5	20.0	0.158	8.2	LOS A	0.6	5.2	0.08	0.51	0.08	53.2
Approach		241	20.0	254	20.0	0.158	4.7	LOS A	0.6	5.2	0.08	0.52	0.08	53.5
All Vehicles		517	20.0	544	20.0	0.158	5.2	NA	0.6	5.2	0.15	0.54	0.15	53.3

Annexure A1.4

Sidra Output: R547 & R544

Existing 2021 + Development Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%				v/c	sec				
South: R544														
1b	L3	9	20.0	9	20.0	0.009	8.3	LOS A	0.0	0.3	0.40	0.58	0.40	51.9
2	T1	21	20.0	22	20.0	0.065	5.7	LOS A	0.2	1.8	0.41	0.63	0.41	52.1
3a	R1	22	20.0	23	20.0	0.065	8.3	LOS A	0.2	1.8	0.41	0.63	0.41	52.5
Approach		52	20.0	55	20.0	0.065	7.2	LOS A	0.2	1.8	0.41	0.62	0.41	52.2
NorthEast: R544														
24a	L1	19	20.0	20	20.0	0.014	5.3	LOS A	0.1	0.4	0.07	0.55	0.07	52.6
25	T1	217	20.0	228	20.0	0.199	4.5	LOS A	0.8	6.9	0.09	0.51	0.09	53.8
26b	R3	4	20.0	4	20.0	0.199	9.9	LOS A	0.8	6.9	0.09	0.51	0.09	53.2
Approach		240	20.0	253	20.0	0.199	4.6	LOS A	0.8	6.9	0.09	0.51	0.09	53.7
North: R547														
7b	L3	8	20.0	8	20.0	0.007	7.7	LOS A	0.0	0.2	0.32	0.55	0.32	52.2
8	T1	16	20.0	17	20.0	0.173	5.6	LOS A	0.6	5.0	0.49	0.72	0.49	51.1
9a	R1	81	20.0	85	20.0	0.173	8.9	LOS A	0.6	5.0	0.49	0.72	0.49	51.5
Approach		105	20.0	111	20.0	0.173	8.3	LOS A	0.6	5.0	0.48	0.71	0.48	51.5
SouthWest: R547														
30a	L1	46	20.0	48	20.0	0.033	5.3	LOS A	0.1	1.1	0.09	0.55	0.09	52.6
31	T1	180	20.0	189	20.0	0.172	4.5	LOS A	0.7	5.7	0.10	0.52	0.10	53.8
32b	R3	7	20.0	7	20.0	0.172	9.2	LOS A	0.7	5.7	0.10	0.52	0.10	53.1
Approach		233	20.0	245	20.0	0.172	4.8	LOS A	0.7	5.7	0.10	0.52	0.10	53.5
All Vehicles		630	20.0	663	20.0	0.199	5.5	NA	0.8	6.9	0.18	0.56	0.18	53.1

Annexure A1.5

Sidra Output: R547 & R544

Future 2026 Background Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
1b	L3	6	20.0	6	20.0	0.005	7.8	LOS A	0.0	0.2	0.33	0.55	0.33	52.1
2	T1	17	20.0	18	20.0	0.037	5.2	LOS A	0.1	1.0	0.32	0.56	0.32	52.9
3a	R1	12	20.0	13	20.0	0.037	7.0	LOS A	0.1	1.0	0.32	0.56	0.32	53.3
Approach		35	20.0	37	20.0	0.037	6.3	LOS A	0.1	1.0	0.32	0.56	0.32	52.9
NorthEast: R544														
24a	L1	12	20.0	13	20.0	0.009	5.3	LOS A	0.0	0.3	0.07	0.55	0.07	52.6
25	T1	153	20.0	161	20.0	0.137	4.4	LOS A	0.5	4.4	0.08	0.51	0.08	53.9
26b	R3	1	20.0	1	20.0	0.137	9.2	LOS A	0.5	4.4	0.08	0.51	0.08	53.2
Approach		166	20.0	175	20.0	0.137	4.5	LOS A	0.5	4.4	0.08	0.51	0.08	53.8
North: R547														
7b	L3	6	20.0	6	20.0	0.005	7.5	LOS A	0.0	0.2	0.27	0.53	0.27	52.3
8	T1	15	20.0	16	20.0	0.121	5.4	LOS A	0.4	3.4	0.42	0.65	0.42	52.0
9a	R1	63	20.0	66	20.0	0.121	7.6	LOS A	0.4	3.4	0.42	0.65	0.42	52.3
Approach		84	20.0	88	20.0	0.121	7.2	LOS A	0.4	3.4	0.41	0.64	0.41	52.3
SouthWest: R547														
30a	L1	75	20.0	79	20.0	0.054	5.3	LOS A	0.2	1.8	0.08	0.55	0.08	52.6
31	T1	143	20.0	151	20.0	0.135	4.5	LOS A	0.5	4.4	0.08	0.52	0.08	53.8
32b	R3	6	20.0	6	20.0	0.135	8.2	LOS A	0.5	4.4	0.08	0.52	0.08	53.1
Approach		224	20.0	236	20.0	0.135	4.8	LOS A	0.5	4.4	0.08	0.53	0.08	53.4
All Vehicles		509	20.0	536	20.0	0.137	5.2	NA	0.5	4.4	0.15	0.54	0.15	53.3

Annexure A1.6

Sidra Output: R547 & R544

Future 2026 Background Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
1b	L3	10	20.0	11	20.0	0.010	8.2	LOS A	0.0	0.3	0.39	0.58	0.39	52.0
2	T1	24	20.0	25	20.0	0.066	5.5	LOS A	0.2	1.8	0.39	0.61	0.39	52.3
3a	R1	22	20.0	23	20.0	0.066	8.0	LOS A	0.2	1.8	0.39	0.61	0.39	52.7
Approach		56	20.0	59	20.0	0.066	7.0	LOS A	0.2	1.8	0.39	0.60	0.39	52.4
NorthEast: R544														
24a	L1	19	20.0	20	20.0	0.014	5.3	LOS A	0.1	0.4	0.08	0.55	0.08	52.6
25	T1	188	20.0	198	20.0	0.174	4.5	LOS A	0.7	5.8	0.10	0.51	0.10	53.8
26b	R3	4	20.0	4	20.0	0.174	10.2	LOS B	0.7	5.8	0.10	0.51	0.10	53.1
Approach		211	20.0	222	20.0	0.174	4.7	LOS A	0.7	5.8	0.09	0.52	0.09	53.7
North: R547														
7b	L3	8	20.0	8	20.0	0.007	7.8	LOS A	0.0	0.2	0.33	0.55	0.33	52.2
8	T1	19	20.0	20	20.0	0.197	5.7	LOS A	0.7	5.8	0.49	0.73	0.49	51.2
9a	R1	94	20.0	99	20.0	0.197	8.7	LOS A	0.7	5.8	0.49	0.73	0.49	51.5
Approach		121	20.0	127	20.0	0.197	8.2	LOS A	0.7	5.8	0.48	0.71	0.48	51.5
SouthWest: R547														
30a	L1	53	20.0	56	20.0	0.038	5.3	LOS A	0.2	1.3	0.09	0.54	0.09	52.6
31	T1	187	20.0	197	20.0	0.180	4.5	LOS A	0.7	6.0	0.11	0.52	0.11	53.7
32b	R3	8	20.0	8	20.0	0.180	9.0	LOS A	0.7	6.0	0.11	0.52	0.11	53.1
Approach		248	20.0	261	20.0	0.180	4.8	LOS A	0.7	6.0	0.11	0.52	0.11	53.5
All Vehicles		636	20.0	669	20.0	0.197	5.6	NA	0.7	6.0	0.20	0.56	0.20	53.1

Annexure A1.7

Sidra Output: R547 & R544

Future 2026 Background + Development Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
1b	L3	6	20.0	6	20.0	0.006	7.9	LOS A	0.0	0.2	0.35	0.55	0.35	52.1
2	T1	17	20.0	18	20.0	0.048	5.3	LOS A	0.2	1.3	0.37	0.59	0.37	52.4
3a	R1	17	20.0	18	20.0	0.048	7.8	LOS A	0.2	1.3	0.37	0.59	0.37	52.8
Approach		40	20.0	42	20.0	0.048	6.8	LOS A	0.2	1.3	0.37	0.58	0.37	52.5
NorthEast: R544														
24a	L1	14	20.0	15	20.0	0.010	5.3	LOS A	0.0	0.3	0.07	0.55	0.07	52.6
25	T1	174	20.0	183	20.0	0.158	4.5	LOS A	0.6	5.2	0.09	0.51	0.09	53.9
26b	R3	2	20.0	2	20.0	0.158	9.9	LOS A	0.6	5.2	0.09	0.51	0.09	53.2
Approach		190	20.0	200	20.0	0.158	4.6	LOS A	0.6	5.2	0.09	0.51	0.09	53.8
North: R547														
7b	L3	9	20.0	9	20.0	0.008	7.8	LOS A	0.0	0.3	0.33	0.55	0.33	52.2
8	T1	15	20.0	16	20.0	0.133	5.7	LOS A	0.5	3.8	0.47	0.70	0.47	51.4
9a	R1	63	20.0	66	20.0	0.133	8.4	LOS A	0.5	3.8	0.47	0.70	0.47	51.8
Approach		87	20.0	92	20.0	0.133	7.9	LOS A	0.5	3.8	0.46	0.68	0.46	51.8
SouthWest: R547														
30a	L1	75	20.0	79	20.0	0.054	5.3	LOS A	0.2	1.8	0.08	0.55	0.08	52.6
31	T1	191	20.0	201	20.0	0.178	4.5	LOS A	0.7	6.0	0.09	0.51	0.09	53.8
32b	R3	6	20.0	6	20.0	0.178	8.6	LOS A	0.7	6.0	0.09	0.51	0.09	53.1
Approach		272	20.0	286	20.0	0.178	4.8	LOS A	0.7	6.0	0.08	0.52	0.08	53.5
All Vehicles		589	20.0	620	20.0	0.178	5.3	NA	0.7	6.0	0.16	0.55	0.16	53.2

Annexure A1.8

Sidra Output: R547 & R544

Future 2026 Background + Development Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
1b	L3	10	20.0	11	20.0	0.011	8.5	LOS A	0.0	0.3	0.43	0.60	0.43	51.8
2	T1	24	20.0	25	20.0	0.079	5.9	LOS A	0.3	2.2	0.45	0.66	0.45	51.7
3a	R1	25	20.0	26	20.0	0.079	9.0	LOS A	0.3	2.2	0.45	0.66	0.45	52.1
Approach		59	20.0	62	20.0	0.079	7.7	LOS A	0.3	2.2	0.44	0.65	0.44	51.9
NorthEast: R544														
24a	L1	22	20.0	23	20.0	0.016	5.3	LOS A	0.1	0.5	0.08	0.55	0.08	52.6
25	T1	243	20.0	256	20.0	0.226	4.5	LOS A	1.0	8.0	0.10	0.51	0.10	53.8
26b	R3	5	20.0	5	20.0	0.226	10.8	LOS B	1.0	8.0	0.10	0.51	0.10	53.1
Approach		270	20.0	284	20.0	0.226	4.7	LOS A	1.0	8.0	0.10	0.51	0.10	53.7
North: R547														
7b	L3	9	20.0	9	20.0	0.008	7.9	LOS A	0.0	0.3	0.35	0.56	0.35	52.1
8	T1	19	20.0	20	20.0	0.220	5.9	LOS A	0.8	6.4	0.53	0.75	0.53	50.5
9a	R1	94	20.0	99	20.0	0.220	9.9	LOS A	0.8	6.4	0.53	0.75	0.53	50.9
Approach		122	20.0	128	20.0	0.220	9.1	LOS A	0.8	6.4	0.52	0.74	0.52	50.9
SouthWest: R547														
30a	L1	53	20.0	56	20.0	0.038	5.3	LOS A	0.2	1.3	0.09	0.54	0.09	52.6
31	T1	206	20.0	217	20.0	0.198	4.5	LOS A	0.8	6.8	0.11	0.52	0.11	53.7
32b	R3	8	20.0	8	20.0	0.198	9.8	LOS A	0.8	6.8	0.11	0.52	0.11	53.1
Approach		267	20.0	281	20.0	0.198	4.8	LOS A	0.8	6.8	0.11	0.52	0.11	53.5
All Vehicles		718	20.0	756	20.0	0.226	5.7	NA	1.0	8.0	0.20	0.57	0.20	53.0

Annexure A2: R544 & D1947 North

- ▣ A2.1 – Existing 2021 Weekday AM Peak Hour Traffic
- ▣ A2.2 – Existing 2021 Weekday PM Peak Hour Traffic
- ▣ A2.3 – Existing 2021 Plus Development Weekday AM Peak Hour Traffic
- ▣ A2.4 – Existing 2021 Plus Development Weekday PM Peak Hour Traffic
- ▣ A2.5 – Future 2026 Background Weekday AM Peak Hour Traffic
- ▣ A2.6 – Future 2026 Background Weekday PM Peak Hour Traffic
- ▣ A2.7 – Future 2026 Background Plus Development Weekday AM Peak Hour Traffic
- ▣ A2.8 – Future 2026 Background Plus Development Weekday PM Peak Hour Traffic

Annexure A2.1

Sidra Output: R544 & D1947 North

Existing 2021 Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
2	T1	96	20.0	101	20.0	0.071	0.3	LOS A	0.3	2.3	0.13	0.14	0.13	58.2
3	R2	38	20.0	40	20.0	0.071	6.5	LOS A	0.3	2.3	0.22	0.23	0.22	54.4
Approach		134	20.0	141	20.0	0.071	2.1	NA	0.3	2.3	0.15	0.17	0.15	57.1
East: D1947														
4	L2	17	20.0	18	20.0	0.024	9.2	LOS A	0.1	0.7	0.08	0.98	0.08	50.6
6	R2	4	20.0	4	20.0	0.024	11.6	LOS B	0.1	0.7	0.08	0.98	0.08	50.4
Approach		21	20.0	22	20.0	0.024	9.6	LOS A	0.1	0.7	0.08	0.98	0.08	50.6
North: R544														
7	L2	13	20.0	14	20.0	0.021	5.8	LOS A	0.0	0.0	0.00	0.23	0.00	55.4
8	T1	119	20.0	125	20.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.6
Approach		132	20.0	139	20.0	0.060	0.6	NA	0.0	0.0	0.00	0.06	0.00	59.2
All Vehicles		287	20.0	302	20.0	0.071	1.9	NA	0.3	2.3	0.08	0.18	0.08	57.5

Annexure A2.2

Sidra Output: R544 & D1947 North

Existing 2021 Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
2	T1	155	20.0	163	20.0	0.083	0.2	LOS A	0.2	1.3	0.06	0.06	0.06	59.2
3	R2	18	20.0	19	20.0	0.083	6.4	LOS A	0.2	1.3	0.09	0.08	0.09	56.0
Approach		173	20.0	182	20.0	0.083	0.8	NA	0.2	1.3	0.07	0.06	0.07	58.8
East: D1947														
4	L2	69	20.0	73	20.0	0.084	9.2	LOS A	0.3	2.6	0.08	0.97	0.08	50.7
6	R2	8	20.0	8	20.0	0.084	12.5	LOS B	0.3	2.6	0.08	0.97	0.08	50.5
Approach		77	20.0	81	20.0	0.084	9.5	LOS A	0.3	2.6	0.08	0.97	0.08	50.7
North: R544														
7	L2	9	20.0	9	20.0	0.019	5.8	LOS A	0.0	0.0	0.00	0.17	0.00	55.9
8	T1	114	20.0	120	20.0	0.056	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
Approach		123	20.0	129	20.0	0.056	0.5	NA	0.0	0.0	0.00	0.04	0.00	59.4
All Vehicles		373	20.0	393	20.0	0.084	2.5	NA	0.3	2.6	0.05	0.24	0.05	57.1

Annexure A2.3

Sidra Output: R544 & D1947 North

Existing 2021 + Development Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
2	T1	96	20.0	101	20.0	0.111	0.4	LOS A	0.5	4.2	0.11	0.15	0.11	58.2
3	R2	94	20.0	99	20.0	0.111	6.6	LOS A	0.5	4.2	0.30	0.43	0.30	52.7
Approach		190	20.0	200	20.0	0.111	3.5	NA	0.5	4.2	0.21	0.29	0.21	55.4
East: D1947														
4	L2	41	20.0	43	20.0	0.060	9.1	LOS A	0.2	1.8	0.02	1.02	0.02	50.4
6	R2	10	20.0	11	20.0	0.060	12.9	LOS B	0.2	1.8	0.02	1.02	0.02	50.2
Approach		51	20.0	54	20.0	0.060	9.8	LOS A	0.2	1.8	0.02	1.02	0.02	50.4
North: R544														
7	L2	31	20.0	33	20.0	0.024	5.8	LOS A	0.0	0.0	0.00	0.49	0.00	53.4
8	T1	119	20.0	125	20.0	0.069	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach		150	20.0	158	20.0	0.069	1.2	NA	0.0	0.0	0.00	0.12	0.00	58.3
All Vehicles		391	20.0	412	20.0	0.111	3.4	NA	0.5	4.2	0.10	0.32	0.10	55.7

Annexure A2.4

Sidra Output: R544 & D1947 North

Existing 2021 + Development Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
2	T1	155	20.0	163	20.0	0.100	0.3	LOS A	0.3	2.8	0.11	0.11	0.11	58.5
3	R2	41	20.0	43	20.0	0.100	6.5	LOS A	0.3	2.8	0.18	0.17	0.18	55.0
Approach		196	20.0	206	20.0	0.100	1.6	NA	0.3	2.8	0.13	0.12	0.13	57.8
East: D1947														
4	L2	128	20.0	135	20.0	0.173	9.2	LOS A	0.7	5.8	0.07	0.99	0.07	50.5
6	R2	23	20.0	24	20.0	0.173	13.4	LOS B	0.7	5.8	0.07	0.99	0.07	50.3
Approach		151	20.0	159	20.0	0.173	9.8	LOS A	0.7	5.8	0.07	0.99	0.07	50.5
North: R544														
7	L2	16	20.0	17	20.0	0.020	5.8	LOS A	0.0	0.0	0.00	0.29	0.00	55.0
8	T1	114	20.0	120	20.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.6
Approach		130	20.0	137	20.0	0.060	0.7	NA	0.0	0.0	0.00	0.07	0.00	59.0
All Vehicles		477	20.0	502	20.0	0.173	4.0	NA	0.7	5.8	0.07	0.38	0.07	55.5

Annexure A2.5

Sidra Output: R544 & D1947 North

Future 2026 Background Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
2	T1	111	20.0	117	20.0	0.083	0.4	LOS A	0.3	2.8	0.14	0.14	0.14	58.2
3	R2	44	20.0	46	20.0	0.083	6.6	LOS A	0.3	2.8	0.24	0.24	0.24	54.3
Approach		155	20.0	163	20.0	0.083	2.2	NA	0.3	2.8	0.17	0.17	0.17	57.0
East: D1947														
4	L2	20	20.0	21	20.0	0.030	9.2	LOS A	0.1	0.9	0.09	0.98	0.09	50.5
6	R2	5	20.0	5	20.0	0.030	12.3	LOS B	0.1	0.9	0.09	0.98	0.09	50.3
Approach		25	20.0	26	20.0	0.030	9.8	LOS A	0.1	0.9	0.09	0.98	0.09	50.5
North: R544														
7	L2	15	20.0	16	20.0	0.024	5.8	LOS A	0.0	0.0	0.00	0.23	0.00	55.5
8	T1	138	20.0	145	20.0	0.070	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	59.6
Approach		153	20.0	161	20.0	0.070	0.6	NA	0.0	0.0	0.00	0.06	0.00	59.2
All Vehicles		333	20.0	351	20.0	0.083	2.0	NA	0.3	2.8	0.08	0.18	0.08	57.4

Annexure A2.6

Sidra Output: R544 & D1947 North

Future 2026 Background Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%				v/c	sec				
South: R544														
2	T1	180	20.0	189	20.0	0.097	0.2	LOS A	0.2	1.6	0.07	0.06	0.07	59.2
3	R2	21	20.0	22	20.0	0.097	6.6	LOS A	0.2	1.6	0.10	0.09	0.10	56.0
Approach		201	20.0	212	20.0	0.097	0.9	NA	0.2	1.6	0.07	0.06	0.07	58.8
East: D1947														
4	L2	80	20.0	84	20.0	0.099	9.2	LOS A	0.4	3.1	0.10	0.97	0.10	50.7
6	R2	9	20.0	9	20.0	0.099	13.4	LOS B	0.4	3.1	0.10	0.97	0.10	50.4
Approach		89	20.0	94	20.0	0.099	9.6	LOS A	0.4	3.1	0.10	0.97	0.10	50.6
North: R544														
7	L2	10	20.0	11	20.0	0.022	5.8	LOS A	0.0	0.0	0.00	0.16	0.00	56.0
8	T1	132	20.0	139	20.0	0.065	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
Approach		142	20.0	149	20.0	0.065	0.5	NA	0.0	0.0	0.00	0.04	0.00	59.4
All Vehicles		432	20.0	455	20.0	0.099	2.5	NA	0.4	3.1	0.05	0.24	0.05	57.1

Annexure A2.7

Sidra Output: R544 & D1947 North

Future 2026 Background + Development Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
2	T1	111	20.0	117	20.0	0.124	0.4	LOS A	0.6	4.8	0.12	0.16	0.12	58.1
3	R2	100	20.0	105	20.0	0.124	6.8	LOS A	0.6	4.8	0.33	0.43	0.33	52.8
Approach		211	20.0	222	20.0	0.124	3.4	NA	0.6	4.8	0.22	0.29	0.22	55.5
East: D1947														
4	L2	44	20.0	46	20.0	0.067	9.2	LOS A	0.2	2.0	0.04	1.01	0.04	50.3
6	R2	11	20.0	12	20.0	0.067	13.7	LOS B	0.2	2.0	0.04	1.01	0.04	50.1
Approach		55	20.0	58	20.0	0.067	10.1	LOS B	0.2	2.0	0.04	1.01	0.04	50.3
North: R544														
7	L2	33	20.0	35	20.0	0.027	5.8	LOS A	0.0	0.0	0.00	0.46	0.00	53.7
8	T1	138	20.0	145	20.0	0.079	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
Approach		171	20.0	180	20.0	0.079	1.1	NA	0.0	0.0	0.00	0.11	0.00	58.4
All Vehicles		437	20.0	460	20.0	0.124	3.4	NA	0.6	4.8	0.11	0.31	0.11	55.8

Annexure A2.8

Sidra Output: R544 & D1947 North

Future 2026 Background + Development Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: R544														
2	T1	180	20.0	189	20.0	0.114	0.3	LOS A	0.4	3.2	0.12	0.11	0.12	58.6
3	R2	44	20.0	46	20.0	0.114	6.6	LOS A	0.4	3.2	0.18	0.16	0.18	55.1
Approach		224	20.0	236	20.0	0.114	1.6	NA	0.4	3.2	0.13	0.12	0.13	57.8
East: D1947														
4	L2	139	20.0	146	20.0	0.191	9.2	LOS A	0.8	6.4	0.08	0.98	0.08	50.4
6	R2	24	20.0	25	20.0	0.191	14.5	LOS B	0.8	6.4	0.08	0.98	0.08	50.2
Approach		163	20.0	172	20.0	0.191	10.0	LOS B	0.8	6.4	0.08	0.98	0.08	50.4
North: R544														
7	L2	17	20.0	18	20.0	0.023	5.8	LOS A	0.0	0.0	0.00	0.27	0.00	55.1
8	T1	132	20.0	139	20.0	0.068	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.6
Approach		149	20.0	157	20.0	0.068	0.7	NA	0.0	0.0	0.00	0.07	0.00	59.0
All Vehicles		536	20.0	564	20.0	0.191	3.9	NA	0.8	6.4	0.08	0.37	0.08	55.6

Annexure A3: R544 & D1947 South

- ▣ A3.1 – Existing 2021 Weekday AM Peak Hour Traffic
- ▣ A3.2 – Existing 2021 Weekday PM Peak Hour Traffic
- ▣ A3.3 – Existing 2021 Plus Development Weekday AM Peak Hour Traffic
- ▣ A3.4 – Existing 2021 Plus Development Weekday PM Peak Hour Traffic
- ▣ A3.5 – Future 2026 Background Weekday AM Peak Hour Traffic
- ▣ A3.6 – Future 2026 Background Weekday PM Peak Hour Traffic
- ▣ A3.7 – Future 2026 Background Plus Development AM Peak Hour Traffic
- ▣ A3.8 – Future 2026 Background Plus Development Weekday PM Peak Hour Traffic

Annexure A3.1

Sidra Output: R544 & D1947

Existing 2021 Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R544														
5	T1	32	20.0	34	20.0	0.021	0.0	LOS A	0.0	0.1	0.02	0.04	0.02	59.6
6	R2	2	20.0	2	20.0	0.021	5.8	LOS A	0.0	0.1	0.02	0.04	0.02	56.3
Approach		34	20.0	36	20.0	0.021	0.4	NA	0.0	0.1	0.02	0.04	0.02	59.4
NorthEast: D1947														
7	L2	1	20.0	1	20.0	0.004	5.9	LOS A	0.0	0.1	0.13	0.56	0.13	52.4
9	R2	3	20.0	3	20.0	0.004	6.0	LOS A	0.0	0.1	0.13	0.56	0.13	51.9
Approach		4	20.0	4	20.0	0.004	5.9	LOS A	0.0	0.1	0.13	0.56	0.13	52.0
NorthWest: R544														
10	L2	1	20.0	1	20.0	0.020	5.8	LOS A	0.0	0.0	0.00	0.02	0.00	57.2
11	T1	32	20.0	34	20.0	0.020	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		33	20.0	35	20.0	0.020	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles		71	20.0	75	20.0	0.021	0.6	NA	0.0	0.1	0.01	0.06	0.01	59.1

Annexure A3.2

Sidra Output: R544 & D1947

Existing 2021 Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R544														
5	T1	47	20.0	49	20.0	0.030	0.0	LOS A	0.0	0.1	0.01	0.02	0.01	59.7
6	R2	2	20.0	2	20.0	0.030	5.8	LOS A	0.0	0.1	0.01	0.02	0.01	56.4
Approach		49	20.0	52	20.0	0.030	0.2	NA	0.0	0.1	0.01	0.02	0.01	59.6
NorthEast: D1947														
7	L2	1	20.0	1	20.0	0.002	5.9	LOS A	0.0	0.0	0.12	0.55	0.12	52.4
9	R2	1	20.0	1	20.0	0.002	6.0	LOS A	0.0	0.0	0.12	0.55	0.12	51.9
Approach		2	20.0	2	20.0	0.002	6.0	LOS A	0.0	0.0	0.12	0.55	0.12	52.2
NorthWest: R544														
10	L2	1	20.0	1	20.0	0.021	5.8	LOS A	0.0	0.0	0.00	0.02	0.00	57.2
11	T1	34	20.0	36	20.0	0.021	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		35	20.0	37	20.0	0.021	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.8
All Vehicles		86	20.0	91	20.0	0.030	0.3	NA	0.0	0.1	0.01	0.03	0.01	59.5

Annexure A3.3

Sidra Output: R544 & D1947

Existing 2021 + Development Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R544														
5	T1	32	20.0	34	20.0	0.033	0.1	LOS A	0.1	0.9	0.09	0.22	0.09	57.7
6	R2	20	20.0	21	20.0	0.033	5.8	LOS A	0.1	0.9	0.09	0.22	0.09	54.6
Approach		52	20.0	55	20.0	0.033	2.3	NA	0.1	0.9	0.09	0.22	0.09	56.4
NorthEast: D1947														
7	L2	9	20.0	9	20.0	0.010	5.9	LOS A	0.0	0.3	0.11	0.55	0.11	52.5
9	R2	3	20.0	3	20.0	0.010	6.1	LOS A	0.0	0.3	0.11	0.55	0.11	51.9
Approach		12	20.0	13	20.0	0.010	5.9	LOS A	0.0	0.3	0.11	0.55	0.11	52.3
NorthWest: R544														
10	L2	1	20.0	1	20.0	0.020	5.8	LOS A	0.0	0.0	0.00	0.02	0.00	57.2
11	T1	32	20.0	34	20.0	0.020	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		33	20.0	35	20.0	0.020	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles		97	20.0	102	20.0	0.033	2.0	NA	0.1	0.9	0.06	0.19	0.06	57.0

Annexure A3.4

Sidra Output: R544 & D1947

Existing 2021 + Development Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R544														
5	T1	47	20.0	49	20.0	0.036	0.0	LOS A	0.1	0.5	0.05	0.10	0.05	58.9
6	R2	10	20.0	11	20.0	0.036	5.8	LOS A	0.1	0.5	0.05	0.10	0.05	55.7
Approach		57	20.0	60	20.0	0.036	1.0	NA	0.1	0.5	0.05	0.10	0.05	58.3
NorthEast: D1947														
7	L2	18	20.0	19	20.0	0.014	5.9	LOS A	0.1	0.5	0.11	0.54	0.11	52.4
9	R2	1	20.0	1	20.0	0.014	6.1	LOS A	0.1	0.5	0.11	0.54	0.11	51.9
Approach		19	20.0	20	20.0	0.014	5.9	LOS A	0.1	0.5	0.11	0.54	0.11	52.4
NorthWest: R544														
10	L2	1	20.0	1	20.0	0.021	5.8	LOS A	0.0	0.0	0.00	0.02	0.00	57.2
11	T1	34	20.0	36	20.0	0.021	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		35	20.0	37	20.0	0.021	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.8
All Vehicles		111	20.0	117	20.0	0.036	1.6	NA	0.1	0.5	0.04	0.15	0.04	57.6

Annexure A3.5

Sidra Output: R544 & D1947

Future 2026 Background Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R544														
5	T1	37	20.0	39	20.0	0.025	0.0	LOS A	0.0	0.2	0.02	0.05	0.02	59.5
6	R2	3	20.0	3	20.0	0.025	5.8	LOS A	0.0	0.2	0.02	0.05	0.02	56.2
Approach		40	20.0	42	20.0	0.025	0.5	NA	0.0	0.2	0.02	0.05	0.02	59.2
NorthEast: D1947														
7	L2	2	20.0	2	20.0	0.005	5.9	LOS A	0.0	0.1	0.14	0.55	0.14	52.4
9	R2	4	20.0	4	20.0	0.005	6.0	LOS A	0.0	0.1	0.14	0.55	0.14	51.8
Approach		6	20.0	6	20.0	0.005	6.0	LOS A	0.0	0.1	0.14	0.55	0.14	52.0
NorthWest: R544														
10	L2	1	20.0	1	20.0	0.023	5.8	LOS A	0.0	0.0	0.00	0.02	0.00	57.2
11	T1	37	20.0	39	20.0	0.023	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		38	20.0	40	20.0	0.023	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.8
All Vehicles		84	20.0	88	20.0	0.025	0.7	NA	0.0	0.2	0.02	0.07	0.02	58.9

Annexure A3.6

Sidra Output: R544 & D1947

Future 2026 Background Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%				veh	m				
SouthEast: R544														
5	T1	54	20.0	57	20.0	0.035	0.0	LOS A	0.0	0.2	0.02	0.03	0.02	59.6
6	R2	3	20.0	3	20.0	0.035	5.8	LOS A	0.0	0.2	0.02	0.03	0.02	56.4
Approach		57	20.0	60	20.0	0.035	0.3	NA	0.0	0.2	0.02	0.03	0.02	59.5
NorthEast: D1947														
7	L2	1	20.0	1	20.0	0.003	5.9	LOS A	0.0	0.1	0.14	0.55	0.14	52.4
9	R2	2	20.0	2	20.0	0.003	6.1	LOS A	0.0	0.1	0.14	0.55	0.14	51.8
Approach		3	20.0	3	20.0	0.003	6.0	LOS A	0.0	0.1	0.14	0.55	0.14	52.0
NorthWest: R544														
10	L2	1	20.0	1	20.0	0.024	5.8	LOS A	0.0	0.0	0.00	0.01	0.00	57.2
11	T1	39	20.0	41	20.0	0.024	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
Approach		40	20.0	42	20.0	0.024	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		100	20.0	105	20.0	0.035	0.4	NA	0.0	0.2	0.01	0.04	0.01	59.3

Annexure A3.7

Sidra Output: R544 & D1947

Future 2026 Background + Development Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R544														
5	T1	37	20.0	39	20.0	0.037	0.1	LOS A	0.1	1.0	0.09	0.21	0.09	57.8
6	R2	21	20.0	22	20.0	0.037	5.8	LOS A	0.1	1.0	0.09	0.21	0.09	54.7
Approach		58	20.0	61	20.0	0.037	2.2	NA	0.1	1.0	0.09	0.21	0.09	56.6
NorthEast: D1947														
7	L2	10	20.0	11	20.0	0.011	5.9	LOS A	0.0	0.3	0.12	0.55	0.12	52.4
9	R2	4	20.0	4	20.0	0.011	6.1	LOS A	0.0	0.3	0.12	0.55	0.12	51.9
Approach		14	20.0	15	20.0	0.011	6.0	LOS A	0.0	0.3	0.12	0.55	0.12	52.3
NorthWest: R544														
10	L2	1	20.0	1	20.0	0.023	5.8	LOS A	0.0	0.0	0.00	0.02	0.00	57.2
11	T1	37	20.0	39	20.0	0.023	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		38	20.0	40	20.0	0.023	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.8
All Vehicles		110	20.0	116	20.0	0.037	2.0	NA	0.1	1.0	0.06	0.19	0.06	57.0

Annexure A3.8

Sidra Output: R544 & D1947

Future 2026 Background + Development Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R544														
5	T1	54	20.0	57	20.0	0.041	0.0	LOS A	0.1	0.6	0.05	0.10	0.05	58.9
6	R2	11	20.0	12	20.0	0.041	5.8	LOS A	0.1	0.6	0.05	0.10	0.05	55.7
Approach		65	20.0	68	20.0	0.041	1.0	NA	0.1	0.6	0.05	0.10	0.05	58.3
NorthEast: D1947														
7	L2	19	20.0	20	20.0	0.016	5.9	LOS A	0.1	0.5	0.12	0.54	0.12	52.4
9	R2	2	20.0	2	20.0	0.016	6.2	LOS A	0.1	0.5	0.12	0.54	0.12	51.8
Approach		21	20.0	22	20.0	0.016	5.9	LOS A	0.1	0.5	0.12	0.54	0.12	52.4
NorthWest: R544														
10	L2	1	20.0	1	20.0	0.024	5.8	LOS A	0.0	0.0	0.00	0.01	0.00	57.2
11	T1	39	20.0	41	20.0	0.024	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
Approach		40	20.0	42	20.0	0.024	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		126	20.0	133	20.0	0.041	1.6	NA	0.1	0.6	0.05	0.15	0.05	57.7

Annexure B

Proposed Mining Infrastructure Layout

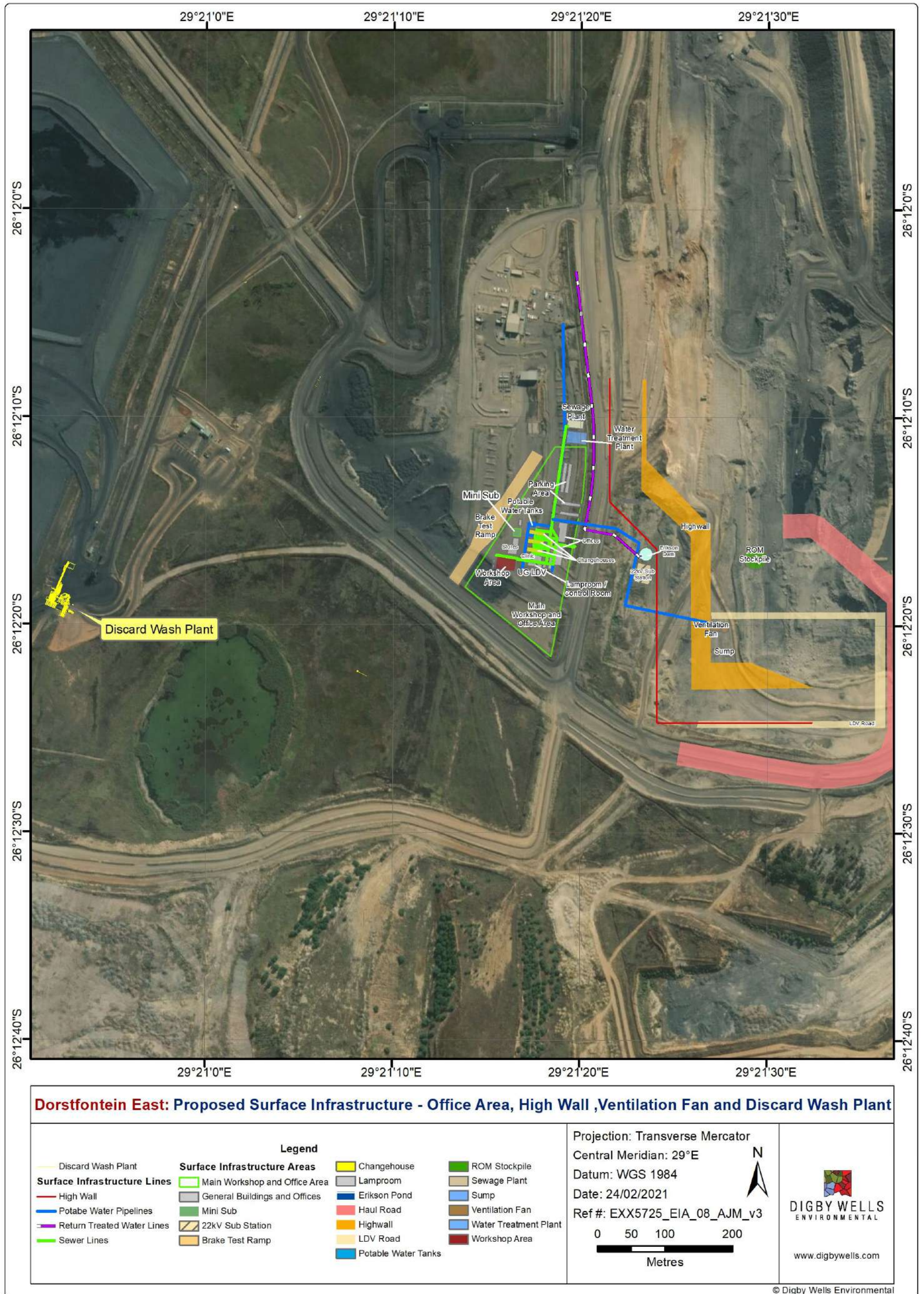


Figure 1-1: Surface Infrastructure Layout

Annexure C

Risk Assessment

No.	Aspect affected	Activity	Potential Impact	Reversibility	Irreplaceable loss	Phase	Size and scale of disturbance	Significance pre-mitigation			Mitigation Type	Significance post-mitigation		
								Probability	Magnitude	Significance		Probability	Magnitude	Significance
TBC	Traffic	Traffic congestion and extended travel time.	With the implementation of the proposed expansions as well as the additional estimated 5-year traffic growth, the affected intersections will have a worst case level of Service of ("LOS") B, all with average delays of about 10 seconds	Reversible	Low degree	Construction, operational.	District and haulage roads	3	3	Medium	Control: Resurfacing of the intersection of the R544 & the D1947 for 200m in all directions, as well as a 400m portion of the D1947 in front of the access to the mine The Road markings on the intersection of the R544 & D1947 will be repainted	2	2	Low