Remaining Extent of the Farm Klondike No 670, Vryburg

KLONDIKE SOLAR PV POWER PLANT

TRAFFIC IMPACT ASSESSMENT

MAY 2016

CONSULTING ENGINEERS

Project: 7051.01

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REPORT SHEET

Property Description:	*Remaining Extent of the Farm Klondike No 670, Vryburg*
Municipal Area:	*Dr Ruth Segomotsi Mompati District Municipality*
Application:	
Type of Report:	*Traffic Impact Assessment*
Project Number:	*7051.01*
Declaration	*I, Koot Marais, author of this study, hereby certify that I am a professional traffic engineer (registration No 920023) and that I have the required experience and training in the field of traffic and transportation engineering as required by the Engineering Council of South Africa (ECSA), to compile traffic impact studies and I take full responsibility for the content, including all calculations, conclusions and recommendations made herein.*
Compiled By:	*Koot Marais Pr Eng 920023*
Signed:	
Date:	*May 2016*

PREPARED BY:

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1 INTRODUCTION

1.1 Aim of the Study

The aim of this study was to assess the traffic impact of the planned **Klondike Solar Projects** on the **Remaining Extent of the Farm Klondike No 670, Vryburg.** The projects consist of the following:

- AMDA Delta,
- AMDA Echo, and
- AMDA Foxtrot

1.2 Background

Although related, the purpose of the study was twofold, namely:

- As required with any change in land use, information must be provided to the relevant authorities and in particular the road authorities on the possible impact of the development on the functioning of the road network. If aspects of the impact are unacceptable, recommendations should be made as to how this should be addressed.

- The Department of Environmental Affairs also requires the compilation of a traffic management plan for the site that should focus on the site access road/s to ensure that no hazards would result from the increased truck traffic and the traffic flow would not be adversely impacted. This Plan must include measures to minimise impacts on local commuters e.g. limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time and avoid using roads through densely populated built-up areas so as to not to disturb existing retail and commercial operations.

In practical terms this requires the determination of the traffic impact of the planned development and the recommendation of mitigating factors should the impact be unacceptable. As a result, this study was in principle based on the *Manual for Traffic Impact Studies*[1]*;* although considering the nature of the development, not all aspects of a standard traffic impact study have to be considered.

This document reports on the findings of the study.

1.3 Site Location

The location of the development is shown in Figure 1.1. The site is located to the south west of Vryburg; to the south of the N14 and to the west of the Vryburg – Reivilo District Road.

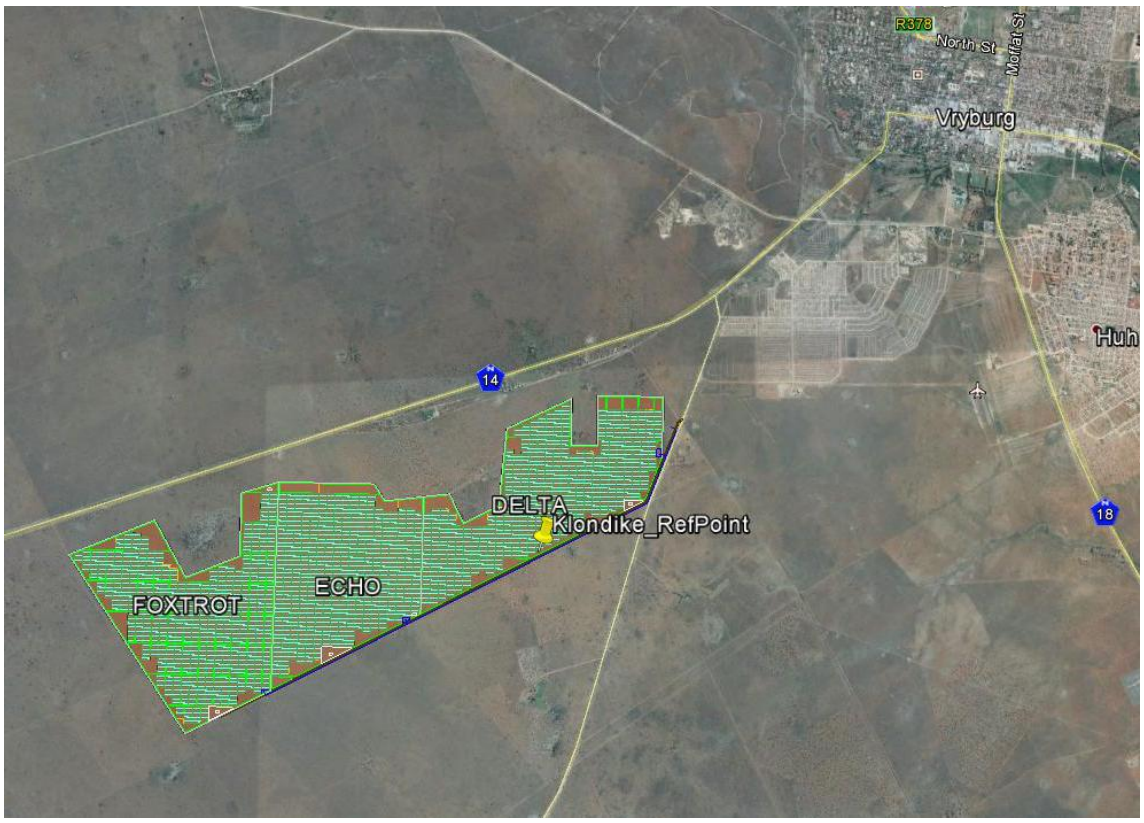

Figure 1.1 Location Plan

The development area is also shown in the photo below.

Photo 1: Development site as seen from the Vryburg – Reivilo District Road

1.4 Development

AMDA Developments plan on developing the AMDA Delta, - Echo and -Foxtrot 75MW solar PV power plants at the Klondike site just west of Vryburg in the North West Province and is in the process of securing the development rights, consents and authorisations necessary to bid the project in the Department of Energy's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

The developments under consideration are 75MW Photovoltaic (PV) solar facilities with a maximum generation capacity of 75MW (megawatts) AC (Alternating Current). The facilities will probably consist of fixed or single-axis tracking PV panel arrays, which will convert solar energy from the sun (Direct-Current DC = >90MW) into electricity (Alternating-Current AC = 75MW).

The electricity from the PV power plants will be evacuated via a 132kV overhead line to the new collector sub-station on the site and from there to the Eskom grid at their Mookodi sub-station. The connection point for the evacuation line will be determined by the Eskom grid connection requirements and the line will be designed and built to Eskom's standards.

The density of development is highest for fixed rack systems and lowest if two axis trackers are used. Typically fixed rack systems would take up about 2 to 3 ha/MW and a PV plant using trackers would need about 4.5 to 6ha/MW. The current trend in the highly competitive REIPPPP market implies that either fixed structures or horizontal single axis tracking systems will most likely be used. On average, a 75MW plant should require approximately 225Ha.

Panels are normally designed to operate unattended and with low maintenance for 20 year.

1.5 Scope of Analysis

The site was visited and traffic operations and road conditions were observed on 24 and 25 May 2015.

2 BACKGROUND INFORMATION

2.1 Existing Road Network

The most important roads in the area are the following:

a) N14

The N14 is a national route and runs from Springbok in the Northern Cape to Pretoria. It passes through Upington, Kuruman, Vryburg, Krugersdorp and Centurion. This road is part of the SANRAL network and is mostly a two lane undivided road.

Photo 2: N14 between Vryburg and Kuruman

b) Vryburg – Reivilo District Road

This gravel road links the N14 with the R371, which links with Reivilo. The road is a gravel road and provides access to adjacent properties.

Photo 3: Road between Vryburg and Reivilo

2.2 Road Planning

There is no known road planning that will directly affect the development.

3 TRIP GENERATION & CAPACITY CONSIDERATIONS

The developments can broadly be categorised as industrial types of developments, but cannot from a trip generation point of view be regarded as a typical industrial development. Industrial developments are in general relatively labour intensive with people working at the facility, and products being transported to and from the site. In this instance the facilities will mostly function unattended and the only trips generated during the operating phase will be security and maintenance trips, which are expected to be limited.

The main trip generation will be during the initiation of the project when the site is prepared, but especially during the construction period, which is expected to have a duration of 15 to 18 months.

Owing to the relatively open or expansive nature of the PV plant and hence the construction process, no specific service roads are envisaged. The site will be sufficiently cleared to allow access for the excavation equipment and the rough terrain vehicles that will deliver the site assembled PV rack or trackers structures to their positions.

Vegetative ground cover reduces dust which influences the PV panel efficiency. The re-growth of the ground cover or rehabilitation is therefore important to the PV plant. It will thus be aimed to minimise the disruption of the existing vegetative ground cover and minimise the stripping and site clearing, and rather cut the vegetation down to between 200 – 300mm.

The portions of the site needed will be cleared, grubbed and graded by means of the necessary cuts and fills in order to condition the terrain to the maximum slopes allowed for buildings, roads and racks. Given the flat nature of the site there very little cut and fill is envisaged.

Trip generation during construction is difficult to accurately estimate as it depends on the tempo of construction and types - and size of vehicles used to transport materials. It is however expected that during the construction phase the traffic will peak at approximately 10 large delivery vehicles and 40 to 50 concrete trucks per day while the footings are being cast and then drop to about 20 to 30 large delivery vehicles per day while the electrical reticulation is being installed and the trackers are being erected.

Importantly, construction of a Solar PV facility does not require abnormal load vehicles during the construction or operational phases. The materials all fit on standard interlink vehicles or in standard containers and the concrete gets delivered in ready-mix type vehicles.

Considering the relatively low traffic volumes on the N14 and the District Road, no capacity problems are expected as a result of the construction vehicles and no road improvements are required based on capacity considerations.

The operational phase includes all operations needed to be carried out to maintain the PV power plant in a full operational mode producing as much electricity as possible and feeding it into the Eskom distribution network.

As an example, but not limited to, the following activities occur during the operational phase:

- Checking and verifying of the electricity production
- Maintaining and monitoring a weather station
- Routine inspection of all equipment and systems
- Periodic maintenance
- Periodic cleaning of PV modules
- 24hour security operations

In a case where there are multiple sites in close proximity, the manager, key technical and administrative staff is located at one of the sites and each site has general workers, technicians, electricians and security. It is expected that there will be a team of 5 or 6 people employed at each project and a further common team of about 10 people based at one of the sites. Permanent 24hour security with two or three shifts per day will be provided.

In total, it is expected that there will be approximately 25 people permanently employed at the three sites combined during the operational phase with an additional PV module cleaning team of ±15 people spending approximately two months at each site cleaning the modules. Modules should get cleaned twice a year.

There will be no residential or overnight accommodation on the site.

In summary it is expected that on average the traffic generated by the PV plant during the operation phase will be in the order of five to ten vehicles per day. As traffic volumes on the N14 and the District Road are low, the impact of these trips will obviously be negligible.

Based on the above, no improvements are required at the accesses due specifically to capacity considerations. Certain improvements are however required from a road safety point of view as discussed in the following chapter.

4 ACCESS

Access to the site could either be via the existing access to the farm from the N14 and/or a new access road from the existing Vryburg – Reivilo District Road. The following accesses are shown in the figure below:

a) Position A: Access from the N14,
b) Position B: A proposed access as per the concept layout of the site,
c) Position C1 and C2: Alternative access positions identified on site.

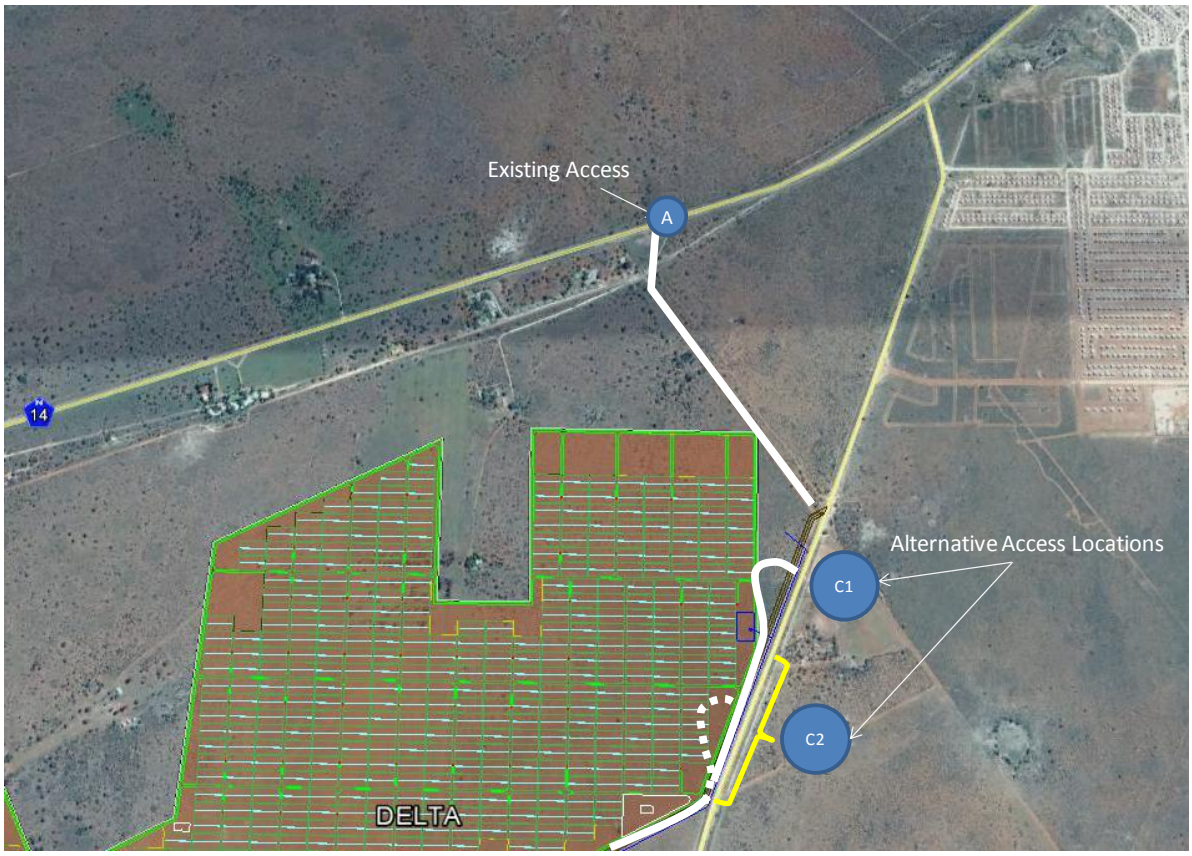

Figure 4.1 Possible Accesses

Although there are no capacity concerns with access, it must be expected that there will be some increase in traffic, especially during the construction phase, and in particular an increase in heavy vehicle volumes during this stage. As a result it is prudent to investigate the possible impact of this increase in volumes, and specifically whether there are any road safety concerns as a result of the increased traffic.

4.1 Access from the N14 - Position A

The current access is shown below.

Photo 4: Current access position from N14

4.1.1 Road Classification

To determine the appropriate access spacing, road classification needs to be determined. The *TRH 26 South African Road Classification and Access Management Manual* [10] uses a six-class rural and urban road classification system. The first three classes in the system consist of mobility roads while the second three classes are used for access/activity roads or streets

A distinction is made between rural and urban areas. Roads in rural and urban areas have the same six functional classes but at different scales and standards. Rural roads have longer reaches of connectivity and therefore require higher levels of mobility than urban roads. It is therefore necessary that the classification system should differentiate between rural and urban areas.

Rural Classes		**Urban Classes**	
R1	Rural principal arterial*	U1	Urban principal arterial
R2	Rural major arterial*	U2	Urban major arterial
R3	Rural minor arterial*	U3	Urban minor arterial
R4	Rural collector road	U4	Urban collector street
R5	Rural local road	U5	Urban local street
R6	Rural walkway	U6	Urban Walkway

Based on the Manual the N14 can be classified as a R2 Rural major arterial. The Manual describes a Class R2 rural major arterials as follows:

Rural major arterials carry inter-regional traffic between:

- *Smaller cities and medium to large towns (population typically greater than about 25000);*
- *Smaller border posts;*
- *Class 1 and other Class 2 routes;*
- *Important regions, transport nodes and commercial areas that generate large volumes of freight and other traffic such as seaports and international airports.*
- *Smaller centres than the above when travel distances are relatively long (longer than 200 km).*

R2 arterials should only be used to carry through traffic and alternatives for local traffic should be provided.

Travel distances on R2 arterials are seldom less than 25 km in length. Some routes, however, can carry traffic over long distances and can reach from one side of a province to the other or even into adjoining provinces.

AADT would typically exceed about 500 vehicles per day on the long distance routes, 2 000 veh/day on medium distance routes but on shorter routes the volumes could exceed 25 000 veh/day.

Class R2 arterials should preferably be continuous routes that would usually serve several nodes (typically in a province). The nodes do not have to be located on the route, but should be located within a reasonable distance from the routes.

4.1.2 Location and Spacing of Access

Considering the functional classification of the N14 as a R2 rural arterial, access spacing was further investigated. The Manual states as follows:

On rural Class 2 and 3 roads, full intersections may be stop or yield controlled. Roundabouts and all-way stop control may also be provided subject to the requirements of this manual. These types of controls, however, can only handle limited volumes of traffic and grade separated interchanges may be required when warranted by traffic volume or safety considerations

The Manual provides the following guidelines with regards to access provisioning:

Each portion of land is entitled to access to the public road network and the right of access to the road or street system cannot be denied. This entitlement must however be allowed in a way that takes into account the public's right to a safe and efficient road system.

Direct and full access to property on Class 4, 5 and 6 streets is the norm, but nevertheless subject to the requirements of this manual. Access to individual properties on Class 1, 2 and 3 roads not meeting the requirements of this manual should normally not be allowed, but in order to comply with the right of access, access may have to be considered when all the following conditions apply:

- *The access exists, and there is no other possible alternative access available to the development;*
- *The access does not jeopardise the possible future provision of intersections to the public road network or accesses to other developments in the area; and*
- *Accesses on arterials should as far as possible serve all the different properties that may benefit from such access.*

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Where access to property is permitted:

- *The proposed access must comply with all the requirements of this manual as well as those provided in the TMH 16 South African Traffic Impact and Site Traffic Assessment Manual of COTO (2012).*
- *It is on condition that the owner of the property will be responsible for improving the access should such improvements become required. This improvement may include geometric improvements or the installation of a traffic signal, roundabout or interchange when warranted or required by the road authority;*

Class R2 typology and intersection control

Intersections should give priority to the through movement. For mobility and safety, right turn bays are essential and left turn deceleration tapers should also be considered.

Occasionally grade separated intersections are found on Class 2 arterial highways. If the cross road is Class 1 or 2, stops on the R2 route may be considered.

Access to property is not allowed along such a route, unless the property is sufficiently large to warrant its own interchange and there is no present or future need to provide a public road intersection. Service stations and sometimes low volume (less the 10 vehicles per day) farm gate or tourist facility accesses are also permitted.

Although the N14 can be classified as a Class R2, note can also be taken of the requirements for Class 3 roads.

Class R3 typology and intersection control

Rural minor arterials are through routes with stops at Class 1 and 2 intersections. Traffic signals should not be considered on rural roads. Roundabouts are acceptable where the classification changes to Class 4 or 5 or when entering an urban area and there is need to reduce speeds.

For safety and capacity, right turn bays will usually be required at intersections, but left turners will not normally need separate deceleration lanes.

As a rule, access to property is not allowed along such a route, unless the property is sufficiently large to warrant its own intersection and there is no present or future need to provide a public road intersection. Access can be considered by the authority if no alternative exists and volumes are low. Service stations are acceptable and low volume (less than 20 vehicles per day) farm gate or tourist facility access can possibly be allowed on existing roads

Considering the above it can be accepted that access to the terrain from the N14 can be considered. As far as the spacing of such an access is concerned the SANRAL Geometric Design Guidelines[9] state as follows:

6.2.7 Spacing of intersections

Designers seldom have influence on the spacing of roadways in a network as it is largely predicated by the original or developed land use. Nevertheless, the spacing of intersections impacts significantly on the operation, level of service and capacity of a roadway. It follows that intersection spacing should, inter alia, be based on road function and traffic volume. The principles described in the National Guidelines for Road Access Management in South Africa should therefore play a role in the determination Geometric Design.

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The Guidelines provides the following minimum access separation:

Table 6.5: Recommended minimum access separations		
Design speed (km/h)	Upstream access class	
	Unsignalised marginal	All other access types
40	20	80
50	35	110
60	50	130
70	70	175
80	100	200
100	170	300
120	250	350

The spacing along this section is shown below.

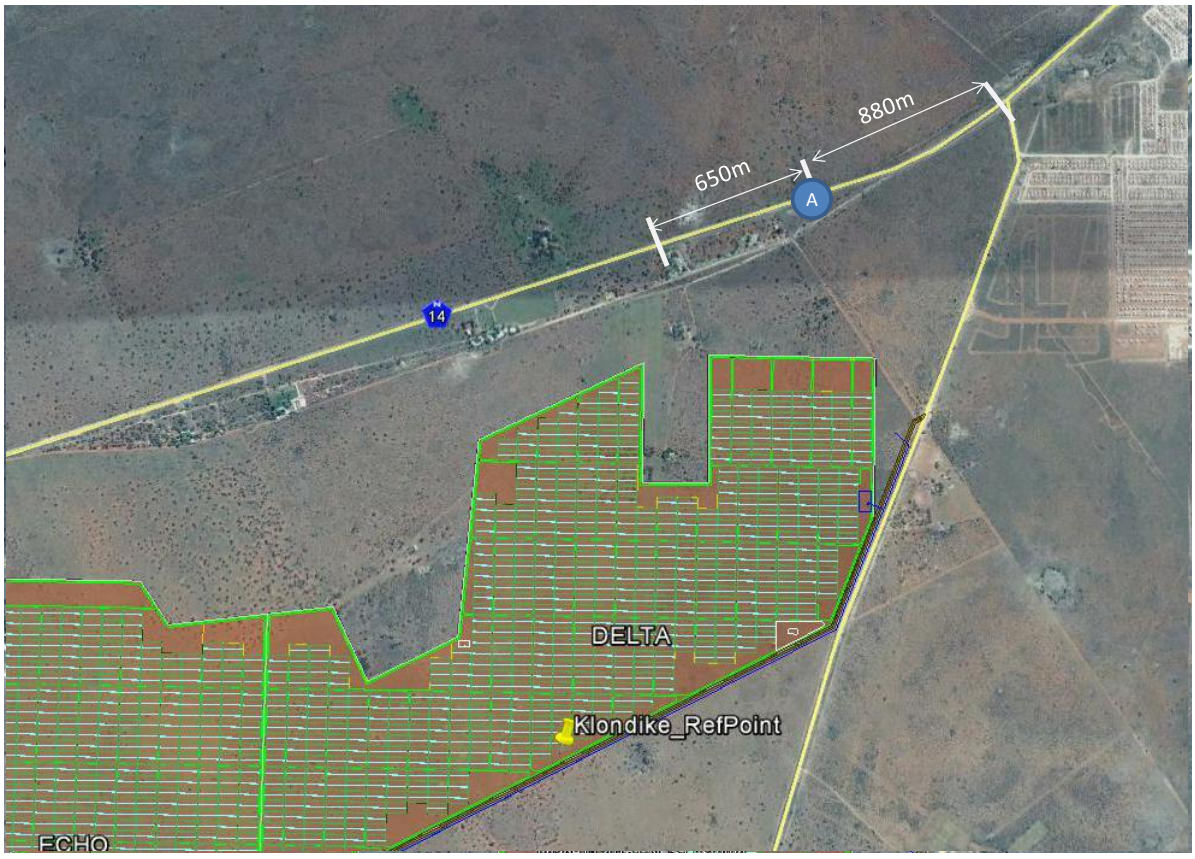

Figure 4.2 Access Spacing along the N14

Spacing is thus acceptable.

4.1.3 Sight Distances

Stopping sight distance should at least at all times be maintained. This is the distance required to enable a driver to observe an obstruction, and stop in time.

Ideally adequate intersection sight distance must be provided at accesses to allow drivers to find a sufficiently large gap in the traffic stream to enter the road safely and with limited disruption to the traffic on the main road.

The *National Guidelines* prescribe the following as far as shoulder sight distance. (Gap Acceptance Sight Distance) is concerned:

TABLE 7.3: MINIMUM GAP ACCEPTANCE SIGHT DISTANCE (METRES)								
Vehicle type	**Eye height**	**Design speed**						
		40 km/h	**50 km/h**	**60 km/h**	**70 km/h**	**80 km/h**	**100 km/h**	**120 km/h**
Stop and yield control, 7.5m wide main road (X = 5m)								
Passenger cars	1.05m	80	100	120	140	160	200	240
Single unit	1.80m	120	150	180	210	240	300	360
Single unit & trailer	1.80m	150	190	225	265	305	380	455
Stop and yield control 22.5m wide main road (X = 5m)								
Passenger cars	1.05m	100	125	150	175	200	250	300
Single unit	1.80m	135	170	200	235	270	335	405
Single unit & trailer	1.80m	165	205	250	290	330	415	495
Yield control (X = 20m)								
Passenger cars	1.05m	65	80	95	110	125	155	190
Single unit	1.80m	75	95	115	135	150	190	230
Single unit & trailer	1.80m	95	115	140	165	185	235	280

Gap acceptance sight distances measured from the eye height to an object height of 1.30m.

Based on the speed limit of 120km/h and main road width of 7.5m and considering the fact that trucks will use the access, sight distances of 455m should preferably be available. In this instance sight distances exceed this value.

Sight distances at this position to the east are approximately 550m and to the west 600m.

Photo 5: Sight distance to the east

Photo 6: Sight distance to the west

Based on the above it can be concluded that the access is in an acceptable position for the development under consideration.

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4.1.4 Access Layout

There are a number of access points and roads at the position where access is currently obtained from, as shown below.

Figure 4.3 Current Access Layout (2013 imagery)

The origin of these roads is unclear but it was possibly a road construction camp. Most of these roads are no longer in use compared to the 2013 situation.

To ensure acceptable access in this position, access should be defined to one position. A concern with the currently used main access road is that the road intersects with the N14 at an angle.

The intersecting angle should not be less than 70 degrees. The actual intersection point can be at any position in this area as long as the intersection angle complies with the requirements. This is shown in the figure below.

Figure 4.4 Possible access points (2016 imagery)

4.1.5 Intersecting Gradient

The N14 is somewhat higher than the adjacent areas, resulting in a fairly steep gradient.

Photo 7: Gradient of access road

The various guidelines recommend a maximum gradient of 4% where an access road intersects with the main road and this should be ensured in the final layout.

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4.1.6 Bell Mouth

There is currently no formal paved bell mouth resulting in vehicles moving from the gravel areas directly onto the roadway. The access should be constructed with a proper paved bell mouth and at least a fair section of paved area, preferably up to the gate

4.1.7 Auxiliary Lanes

There is no generally agreed principle under what specific circumstances right turning lanes and deceleration lanes are required. Most relevant guidelines recommend these lanes with only low volume accesses exempted. The guidelines also normally indicate that right turning lanes are more important than left turn deceleration lanes.

As the vehicles are expected to turn to and from the access in both an eastern and western directions, provision of both a left turn deceleration lane as well as a right turn lane is recommended.

The recommended layout is shown below. Detail should be as per the SANRAL standards. As indicated in Section 4.1.4 the access can be located further to the west and does not have to be at the exact position shown below.

Figure 4.5 Recommended Auxiliary Lanes

4.2 Access from the Vryburg - Reivilo District Road - Position B

The proposed position for access as per the concept layout is shown below.

Photo 8: Possible access position from Vryburg - Reivilo Road

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4.2.1 Location and Spacing of Access

The spacing along this section is shown below.

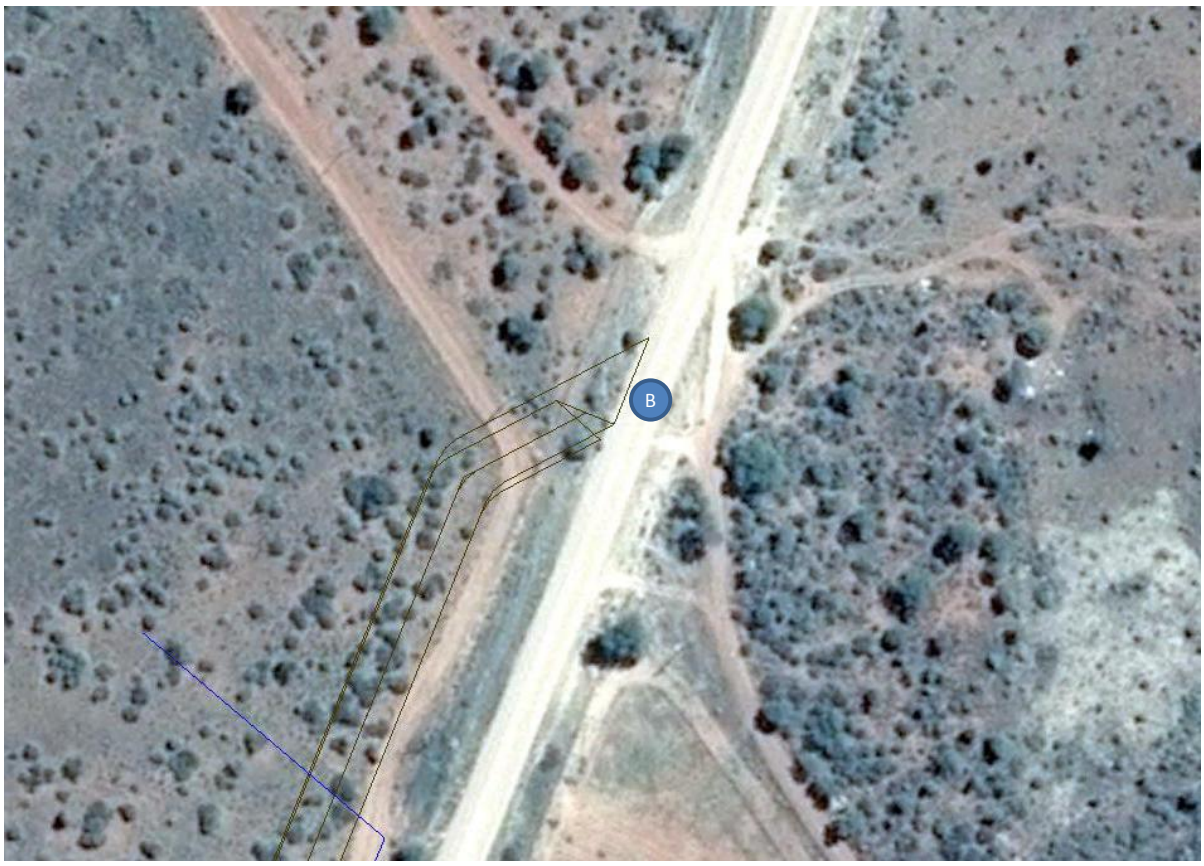

Figure 4.6 Proposed Access Relative to other Accesses

As shown, the proposed access will be located at a position with numerous accesses; as a result access spacing is not really acceptable, and thus not recommended. Another factor that is also problematic in this position is the intersecting angle of the access road.

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4.3 Access from the Vryburg - Reivilo District Road - Position C

Due to the fact that Position B is not recommended, an alternative access position was determined on site. If the development layout is as planned, the most appropriate position is at Position C1 as shown below. The recommended position is opposite the farm access

Figure 4.7 Access Spacing at the Recommended Position - Alternative 1

Photo 9: Access to Farm

An alternate position will be further towards the south. In this instance the layout will have to be altered to accommodate the access. Spacing wise, this will be the preferred location. An access can be provided in any position along a 500m section depending on the impact on the internal layout. The section where access can be provided range from the southern boundary of the property up to a point 200m from the access to the farm shown in Photo 9.

Figure 4.8 Access Spacing at the Recommended Position - Alternative 2

4.3.1 Road Classification

To determine the appropriate access spacing, road classification needs to be determined. The *TRH 26 South African Road Classification and Access Management Manual* [10] uses a six-class rural and urban road classification system. The first three classes in the system consist of mobility roads while the second three classes are used for access/activity roads or streets

A distinction is made between rural and urban areas. Roads in rural and urban areas have the same six functional classes but at different scales and standards. Rural roads have longer reaches of connectivity and therefore require higher levels of mobility than urban roads. It is therefore necessary that the classification system should differentiate between rural and urban areas.

Rural Classes		Urban Classes	
R1	Rural principal arterial*	U1	Urban principal arterial
R2	Rural major arterial*	U2	Urban major arterial
R3	Rural minor arterial*	U3	Urban minor arterial
R4	Rural collector road	U4	Urban collector street
R5	Rural local road	U5	Urban local street
R6	Rural walkway	U6	Urban Walkway

Based on the Manual the road can be classified as a R4 Rural collector road. The Manual describes a Class R4 rural collector as follows:

These roads form the link to local destinations. They do not carry through traffic but only traffic with an origin or destination along or near the road. A collector road must never be quicker to use to pass through an area than the alternative mobility road.

These roads would typically give access to smaller rural settlements, tourist areas, mines, game and nature parks and heritage sites. The roads can also provide direct access to large farms. Collector roads can also be provided within larger rural settlements to provide a collector function in such settlements.

The length of these roads would mostly be shorter than 10 km. Traffic volumes should not be more than about 1 000 vehicles per day

Rural minor arterials carry inter-district traffic between:

- *Small towns, villages and larger rural settlements (population typically less than about 25 000);*
- *Smaller commercial areas and transport nodes of local importance that generate relatively high volumes of freight and other traffic in the district (public transport and freight terminals, railway sidings, small seaports and landing strips);*
- *Very small or minor border posts;*
- *Tourist destinations;*
- *Other Class 1, 2 and 3 routes.*
- *Smaller centres than the above when travel distances are relatively long (longer than 50 to 100 km).*

The typical length of these routes would vary between about 10 km and 100 km. These roads are not busy and traffic volumes between 100 and 2 000 per day are typical. Class R3 arterials are not always continuous, often stopping when a particular destination is reached, although they could also serve more than one node in a district and can cross into adjoining districts

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4.3.2 Location and Spacing of Access

The Guidelines provides the following minimum access separation:

Table 6.5: Recommended minimum access separations		
Design speed (km/h)	Upstream access class	
	Unsignalised marginal	All other access types
40	20	80
50	35	110
60	50	130
70	70	175
80	100	200
100	170	300
120	250	350

The spacing at both Positions C1 and C2 will be acceptable.

4.3.3 Sight Distances

Based on an operating speed of 100km/h the preferred sight distances should be 380m.

Sight distances to and from accesses located at Positions C1 or C2 will be acceptable with no restrictions, as shown below.

Photo 10: Sight distance to the south

Photo 11: Sight distance to the north

4.3.4 Access Layout

Given the nature of the District Road it is not necessary to construct a major access. In principle the access should be developed with a proper gravel bell mouth.

4.4 Summary

Access can in principle be provided at Position A and / or at Position C1 or C2 (a 500m section) in the figure below. Position C2 is preferable to Position C1.

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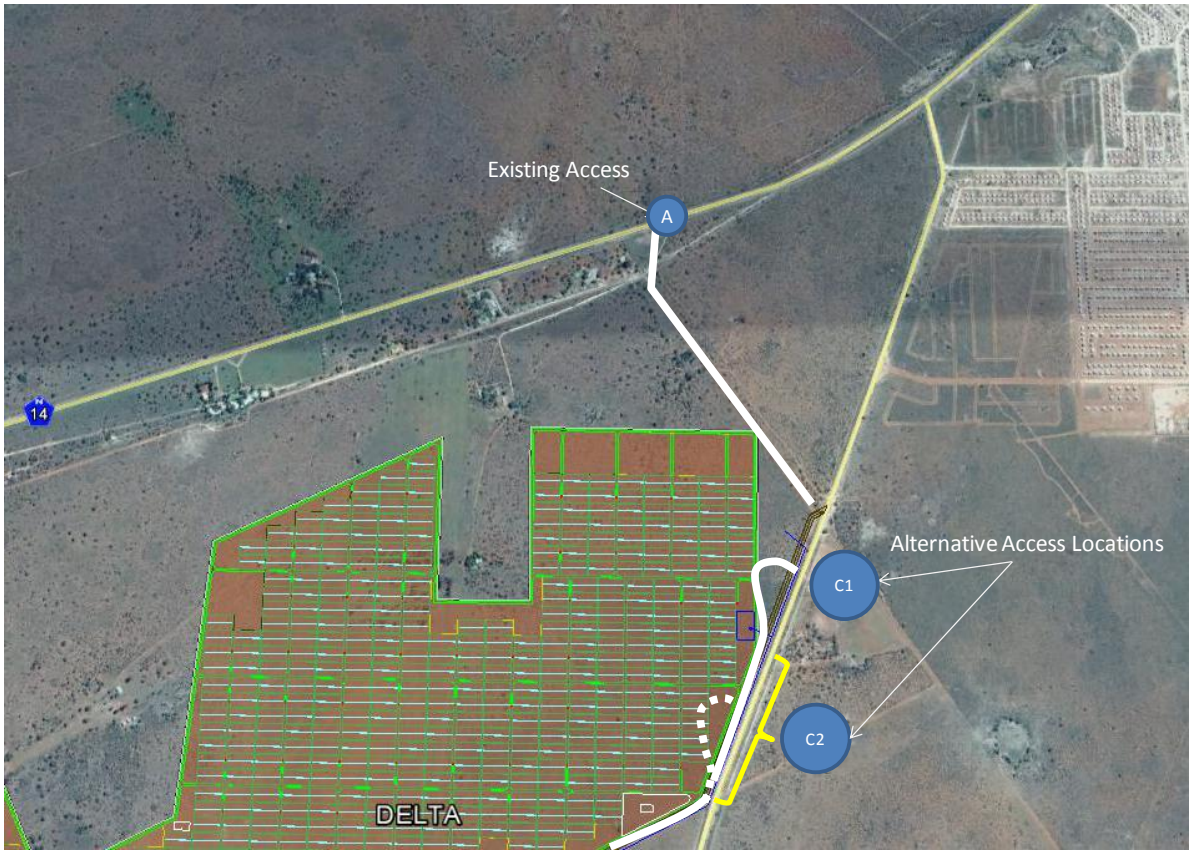

Figure 4.9 Recommended Access Layout

5 INTERNAL ROADS

Internal roads will be planned depending on the actual layout. The roads must be able to accommodate heavy vehicles, and should also not result in excessive dust.

The access - and internal roads will be constructed with surfacing that will minimise dust. It is planned to provide access roads with a width of 6m and internal roads that are 3m wide, with wide, open side drains forming part of the drainage system. Internal roads serving heavy vehicles should ideally be 7.5m wide, with the result that passing bays will be provided at strategic points on the access road to make provision for trucks travelling in opposite directions. This is only likely to occur during the construction phase.

The roads will be built with a minimum of 400mm depth of sub-grade preparation and an aggregate base layer of up to150mm thick compacted to the 95% Proctor (AASHTO). The base layer will either be of material obtained from the excavations on site or aggregate from a commercial source.

The road layout will be designed in order to ensure ease of access to every rack or tracker structure and the horizontal geometry will be designed to enable the turning of trucks and construction vehicles.

Sufficient space will be allowed at the access points to ensure that the vehicles do not queue on to the public roads while being processed through security.

During the operational phase access around the site is generally only required for security and routine inspection. Access for cleaning operations or maintenance is very infrequent.

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6 EXTERNAL ROUTES

Equipment and materials can possibly be transported to the site from either the Vryburg direction or the Kuruman direction.

6.1 Possible Routes

Depending on the access provisioning the following routes could be used.

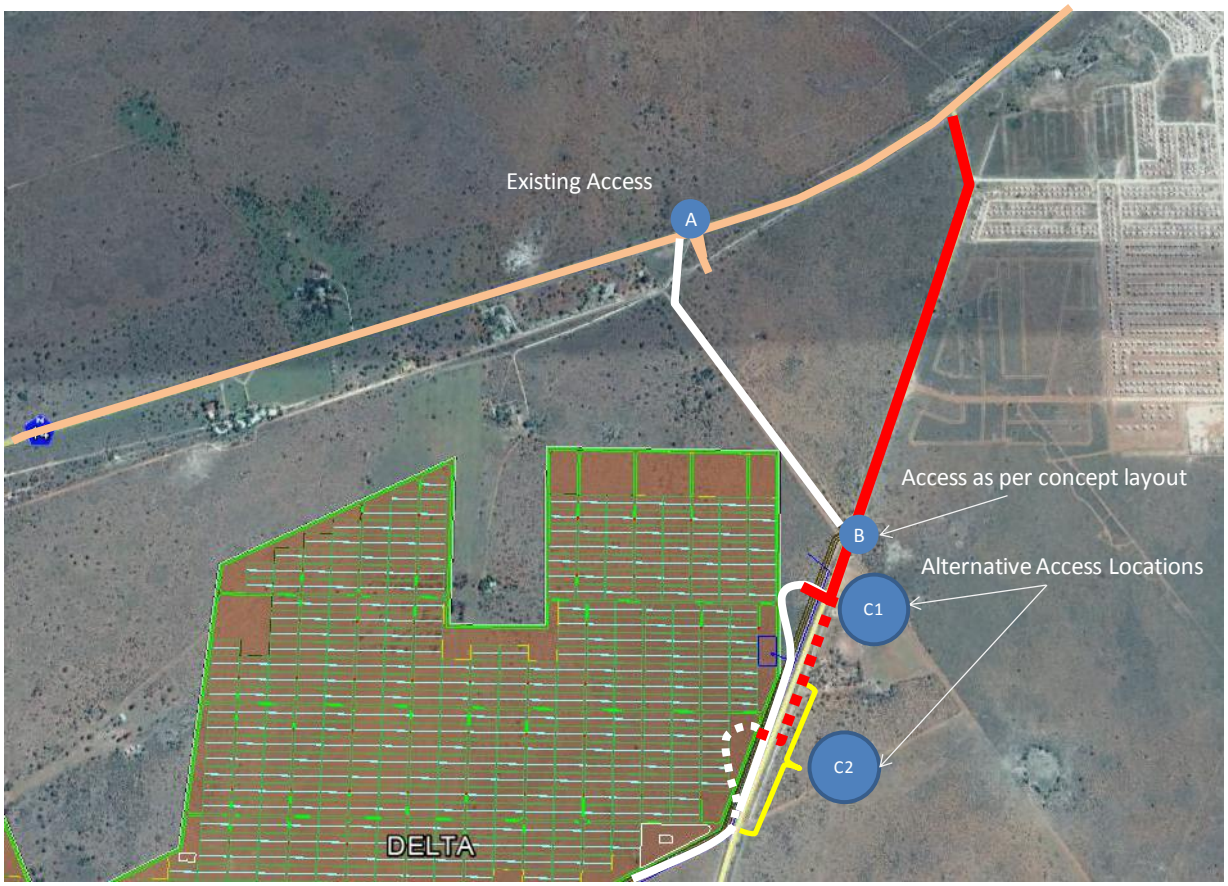

Figure 6.1 Possible External Routes

6.1.1 Option 1: Access from the N14

Access from this position will not affect any communities apart from possibly the lodges located between the site and the N14. The said lodges are however already subjected to heavy vehicles travelling along the N14, with the result that the additional vehicles will not have a noticeable impact. Traffic at the access should not affect the lodges.

Importantly, the access should be upgraded as discussed in Section 4.3.6.

The N14 is in a relatively good condition

Photo 12: Good condition of N14

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6.1.2 Option 2: Access from the Vryburg -Reivilo District Road

Access from this position could affect the nearby community as the District Road borders the nearby community as shown in the plan and photograph below.

Figure 6.2 Vryburg Reivilo Road relative to Residential Area

Photo 13: Residential Areas near District Road

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Although the road does not directly affect the residential area and the community is fortunately located on one side of the roads, thus minimising the possibility of pedestrian crossing, noise and dust pollution can increase as a result of an increase in heavy vehicles; mainly during the construction period.

The said road is relatively wide, but was significantly corrugated at the time of the site visit. Heavy vehicles will increase the need for maintenance.

Photo 14: Corrugated Road

6.2 Summary

The generally accepted principle is that if a property has access from a lower order road, access should not also be provided from a higher order road. In this instance, given the condition of the Vryburg - Reivilo District Road and the close proximity of this road to residential areas, access from a well defined and constructed access on the N14 is in fact preferable to access from the District Road. If required from a practical point of view, access from the latter road can also be provided.

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7. CONCLUSIONS AND RECOMMENDATIONS

a) The development is not expected to generate significant trips, although there will be an increase in traffic, especially in heavy vehicle traffic, during the construction period.

b) No road improvements are required from a capacity point of view. Certain improvements are however required at the accesses from a road safety point of view.

c) Access to the site can be provided from the N14 as well as the Vryburg - Reivilo District Road.

d) Access from the N14 should be restricted to one specific point and the access should be formalised with proper turning lanes.

e) The generally accepted principle is that if a property has access from a lower order road, access should not also be provided from a higher order road. In this instance, given the condition of the Vryburg - Reivilo District Road and the close proximity of this road from residential areas, access from the N14 is in fact preferable to access from the District Road. If required from a practical point of view, access from the latter road can however also be provided.

f) The layout of internal roads will be determined during construction. It is not expected that activities on the site will have any significant impact on the adjacent properties or the external road network.

In summary, it is believed that, the intended development will not have a significant impact on the area from a traffic point of view. Access improvements are nonetheless required, especially to accommodate heavy vehicle activities during the construction stage.

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